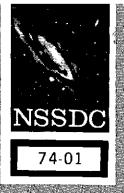
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# Report on Active and Planned Spacecraft and Experiments

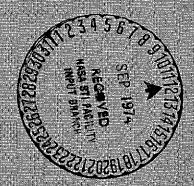
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(NASA-TM-X-69915) REPORT ON ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS (NASA) 651 p HC \$35.75 CSCL 22B

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#### NATIONAL SPACE SCIENCE DATA CENTER

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION - GODDARD SPACE FLIGHT CENTER, GREENBELT, MO.

# REPORT ON ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

Edited by

Julius J. Brecht

National Space Science Data Center
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, Maryland 20771

January 1974

#### FOREWORD

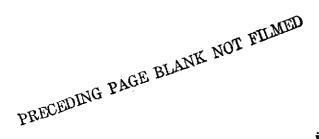
This Report on Active and Planned Spacecraft and Experiments provides the professional community with information on current as well as planned spacecraft activity in a broad range of scientific disciplines. The document provides brief descriptions for these spacecraft and experiments, as well as approximate time periods when data are being accumulated. The performance information for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through September 30, 1973. The National Space Science Data Center (NSSDC) has attempted to update all performance information to that date.

I would like to acknowledge the cooperation of the Acquisition Scientists and others at NSSDC in obtaining information and offering suggestions for this Report. I am most appreciative of the effort of the personnel of NSSDC's on-site contractor, PMI Facilities Management Corporation, in preparing this document for publication. Also, the cooperation of the project offices and experimenters in supplying documentation of their spacecraft and experiments is gratefully acknowledged.

NSSDC plans to publish a <u>Supplement</u> to this <u>Report</u> within six months and a cumulative edition within one year; subsequently, plans call for quarterly supplements and an annual cumulative edition.

January 1974

Julius J. Brecht



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#### INTRODUCTION

#### Purpose

This Report on Active and Planned Spacecraft and Experiments provides the professional community with information on current as well as planned spacecraft activity in a broad range of scientific disciplines. By providing brief descriptions of the spacecraft and experiments, as well as the approximate time periods when data are being accumulated, it is hoped that this document will be useful to many people interested in the scientific, applied, and operational uses of such data. Furthermore, for those planning or coordinating future observational programs employing a number of different techniques such as rockets, balloons, aircraft, ships, and buoys, this document can provide some insight into the contributions that may be provided by orbiting instruments. One such program in which this Report will be utilized is the International Magnetospheric Study, which will occur in the 1976 - 1978 time interval.

#### Contents

This document includes information dealing with active and planned spacecraft and experiments known to the National Space Science Data Center (NSSDC). Included is information concerning a wide range of disciplines: astronomy, earth sciences, meteorology, planetary sciences, aeronomy, particles and fields, solar physics, life sciences, and material sciences. These spacecraft represent the efforts and funding of individual countries, as well as cooperative arrangements among different countries.

Specifically not included in this Report are navigational and communications satellites or passive satellites which are still actively tracked by optical or laser methods for geodetic or atmospheric drag studies. Also not included are spacecraft which contain only continuous radio beacons used for ionospheric studies. Many of these spacecraft are listed in the bi-weekly SPACEWARN Bulletin\*. No attempt has been

\*The SPACEWARN Bulletin is published by the World Data Center A for Rockets and Satellites, Code 601, Goddard Space Flight Center, Greenbelt, Maryland 20771, U.S.A. It is intended to serve as an international communications mechanism for the rapid distribution of information on satellites and space probes. It is published on behalf of the Committee on Space Research (COSPAR) by the International Ursigram and World Days Service (IUWDS), a permanent service of the International Scientific Radio Union in association with the International Astronomical Union and the International Union for Geodesy and Geophysics.

made to include classified spacecraft or experiments. Finally, certain planned spacecraft or continuing series for which no information except the names are known have not been included other than to reference their launching.

The Acquisition Scientists at NSSDC have collected the information contained in this document from a variety of sources during the past several years; e.g., project offices, principal investigators and their staff, publications, etc. The spacecraft and experiments performance information for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through September 30, 1973. NSSDC has attempted to update all performance information to that date.

#### Organization

This Report includes four sections; an introduction is included with each section.

Section 1, "Descriptions of Active Spacecraft and Experiments," is a chronological listing of descriptions of the spacecraft and experiments that were active as of September 30, 1973, and for which NSSDC has at least minimal documentation.

Similarly, Section 2, "Descriptions of Planned Spacecraft and Experiments," includes those planned missions for which NSSDC has some documentation.

Section 3, "Indexes for Active and Planned Spacecraft and Experiments," contains the following series of indexes to the information presented in Sections 1 and 2 of this Report: (1) a sequential listing of spacecraft and experiments, (2) a listing of spacecraft ordered by common name and alternate names, (3) a listing of the investigators associated with the experiments and their current affiliations, (4) a listing of current experiment institutions ordered by institution name, giving the experiments with which each is associated, and (5) phenomenon measured indexes in the form of bar graphs and listings which provide an indication of active and planned space sciences measurements.

Section 4, "Spacecraft and Experiment Status Changes between October 1, 1972, and September 30, 1973," contains three listings of pertinent information concerning (1) launched spacecraft, (2) spacecraft and/or experiments placed in an "operational off" mode, and (3) spacecraft and/or experiments which became "inoperable."

All four sections were generated from NSSDC automated files.

#### Availability of this Report

Upon request, NSSDC will provide copies of this Report and future supplements to an individual or organization resident in the United States who can establish a need, in writing or by telephone, for this information. In addition, the same services are available to professionals outside the United States through the World Data Center A (WDC-A) for Rockets and Satellites. NSSDC's official address for requests is:

National Space Science Data Center Code 601.4 Goddard Space Flight Center Greenbelt, Maryland 20771

Phone: 301 982-6695

Users who reside outside the United States should direct requests to:

World Data Center A for Rockets and Satellites Code 601 Goddard Space Flight Center Greenbelt, Maryland 20771 U.S.A.

Phone: 301-982-6695

Recipients are requested to inform potential users of the availability of this Report. Because of continuing costs involved in publishing a document of this size on a periodic basis, NSSDC encourages individuals colocated in the same organization to share this document.

#### Request for Additions/Corrections

NSSDC continually strives to increase the usefulness of this Report by improving the spacecraft and experiment descriptions and by including additional spacecraft and experiments as they become known to NSSDC. The Report is complete and reasonably accurate concerning NASA and NASA-cooperative programs. However, descriptions of other spacecraft and experiments may be rather terse and incomplete because of a lack of information available to NSSDC. Although in some cases the status of such spacecraft or experiment may have been in doubt, nevertheless it has been included here. It should be noted that the information concerning the planned spacecraft and experiments is very often general in nature and subject to change.

NSSDC would welcome comments as to errors or omissions in this Report. Recommendations regarding the overall contents and organization of this Report would also be appreciated. In particular, it is hoped that principal investigators and project offices will cooperate in bringing such matters to NSSDC's attention.

### Definitions

Several words and phrases are used in this Report in a precise and specific sense. These terms are defined here to clarify the intended meaning to the reader.

Active -

As applied to a spacecraft mission or one of its experiments pertinent to this Report, a general status-of-operation term which means that the spacecraft or experiment was last reported to NSSDC to be in either a "normal" or "partial" status. .........

Apoapsis -

The distance from the surface of the reference body to the furthest orbit point. This distance is expressed as astronomical units (AU) for heliocentric orbits, including planetary system flybys and escape trajectories from the solar system, e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.

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Approved Mission - A planned spacecraft mission status term which means that the spacecraft mission has been approved and funding is or will be available to perform the mission.

Experiment Brief Description -

A description of an experiment containing a concise summary of the experiment purpose and instrument characteristics, emphasizing those relevant to the scientific use of the resulting data. Information about the performance of individual components of the instrumentation is often included.

Inclination -

The angle (in degrees) between the satellite orbital plane and the equatorial plane of the primary gravitational body. For satellites with heliocentric orbits, the ecliptic plane is used in lieu of the equatorial plane.

#### Inoperable -

As applied to a spacecraft, a status-of-operation term which means that the spacecraft is no longer capable of producing any useful scientific data because of malfunction or failure of the spacecraft system, because of the completion of the phase of the spacecraft trajectory in which useful measurements could be performed, or because network support (tracking, command, and telemetry) has been discontinued, etc. As applied to an experiment, a status-of-operation term which means that the experiment is no longer capable of producing any useful scientific data because of a malfunction or failure of the experiment system or critical parts of the spacecraft system, or the completion of the phase of the spacecraft trajectory in which useful measurements could be performed.

#### Normal -

As applied to an active spacecraft, a status-ofoperation term which means that the spacecraft
and other required systems are capable of working,
so that the data would be suitable for all of the
scientific studies planned for the spacecraft when
the spacecraft is turned on and the data are
recorded. As applied to an active experiment, a
status-of-operation term which means that all
experiment and spacecraft systems are working, so
that the data would be suitable for all of the
scientific studies originally planned for the
experiment.

#### NSSDC ID Code -

An identification code used in the NSSDC information system. In this system, each successfully launched spacecraft and experiment is assigned a code based on the launch sequence of the spacecraft. Subsequent to 1962, this code, e.g., 72-012A for the spacecraft Pioneer 10, corresponds to the COSPAR international designation. experiment codes are based on the spacecraft code. For example, the experiments carried aboard the spacecraft 73-019A (Pioneer 11) are numbered 73-019A-01, 73-019A-02, etc. Each prelaunch spacecraft and experiment is also assigned an NSSDC ID Code based on the common name of the spacecraft. For example, the proposed NASA launch, Mariner Jupiter/Saturn A, would be coded MARN77A. The experiments to be carried aboard this spacecraft would be coded MARN77A-01, MARN77A-02, etc. Once a spacecraft is launched

NSSDC ID Code - (continued)

its prelaunch designation is, of course, changed to a postlaunch designation, e.g., Pioneer G which was launched on April 6, 1973 was given the NSSDC ID Code of 73-019A, corresponding to the launch spacecraft common name, Pioneer 11.

Operational Off -

As applied to a spacecraft, a status-of-operation term which means that the spacecraft can still be operated, but it is either turned off or not being used. As applied to an experiment, a status-of-operation term that means that when last tested, the experiment and other required systems were capable of producing at least partially usable data, but the experiment is either turned off or telemetered data are not being recorded. The systems could be activated at some future time to obtain usable data.

Orbit Type -

A word or phrase indicating the most important phase of the trajectory of a given spacecraft mission. The orbit type may be any one of the following: geocentric, selenocentric, heliocentric, venuscentric, marscentric, lunar lander, Venus lander, Mars lander, Jupiter lander, lunar flyby, Venus flyby, Mars flyby, Mercury flyby, Jupiter flyby.

Partial -

As applied to a spacecraft, a status-of-operation term which means the spacecraft and other required systems are working, but not all systems are working as well as the design required. If the spacecraft were turned on and the data recorded, the data would be suitable for only a portion of the scientific studies planned for the spacecraft. As applied to an experiment, a status-of-operation term defined similarly to that for a spacecraft.

Periapsis -

The distance from the surface of the reference body to the nearest orbit point. This distance is expressed as astronomical units (AU) for heliocentric orbits, including planetary system flybys and escape trajectories from the solar system, e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.

Planned -

As applied to a future space science spacecraft mission pertinent to this Report, a general status term which means that the spacecraft mission was last reported to NSSDC as either "approved" or "proposed." As applied to an experiment, an experiment associated with a planned space science spacecraft mission pertinent to this Report.

Proposed Mission -

A planned spacecraft mission status term which means that the mission is under study or detailed design; however, no funds have been approved to perform this mission.

Spacecraft Brief Description -

A description of a spacecraft, containing a concise summary of the spacecraft mission, specifically outlining the overall objectives of the mission and the scientific studies being performed. Information about the performance of individual components of the spacecraft are often included.

Standard -

As applied to a spacecraft or experiment data acquisition rate, a term which means that the data that can be processed and made available to the experimenters are being acquired at the rate or percentage of coverage required to accomplish the planned scientific studies.

Substandard -

As applied to a spacecraft or experiment data acquisition rate, a term which means that the data that can be processed and made available to the experimenters are not being acquired at the rate or percentage of coverage required to accomplish the planned scientific studies.

Unknown -

As a general term, indicates information either unknown or unavailable at NSSDC.

#### Abbreviations and Acronyms

The abbreviations and acronyms listed on the following pages include those used in this Report. In addition the list contains, for the convenience of the reader, the more common abbreviations used in the context of space science satellite experiments. That is, the list includes spacecraft name acronyms, experiment affiliation acronyms and abbreviations, funding agency acronyms and abbreviations, etc. All abbreviations are in upper case letters to correspond to the computer-produced entries in Sections 1, 2, 3, and 4. Note that the same abbreviation is used for both the singular and plural forms. Note also that the same abbreviation may indicate two different definitions; these are separated by a semicolon.

A	angstrom
ABMA	Army Ballistic Missile Agency
ACIC	Aeronautical Chart and Information Center
ACS	attitude control system
A/D	analog to digital
AE	Atmosphere Explorer (satellite, NASA-GSFC)
AEC	Atomic Energy Commission
AFB	Air Force Base
AFCRL	Air Force Cambridge Research Laboratories
AFSC	Air Force Systems Command
AGC	automatic gain control
AIMP	Anchored Interplanetary Monitoring Platform
	(satellite, NASA-GSFC)
ALOSYN	Alouette topside sounder synoptic (data)
ALSEP	Apollo Lunar Surface Experiments Package (NASA)
ALT	altitude
AM	amplitude modulation
AMP	ampere
AMU	atomic mass unit; astronaut maneuvering unit
ANIK	Telecommunications Satellite; also referred to as TELSAT
ANNA	Army, Navy, NASA, Air Force Geodetic Satellite
ANS	Astronomical Netherlands Satellite (Netherlands - NASA, joint project)
AP	magnetic activity index A <sub>n</sub>
APL	Applied Physics Laboratory of Johns Hopkins University
APT	automatic picture transmission
A/R	acquisition/reference
ARC	Ames Research Center (NASA)
ARC-MIN	arc-minute
ARC-SEC	arc-second
ARDC	Air Research and Development Command (now AFSC)

ARPA Advanced Research Projects Agency
ASEE American Science & Engineering, Inc.

ASOS antimony-sulfide oxy-sulfide

ASTP Apollo-Soyuz Test Project (USSR-NASA, joint project)

ATCOS Atmospheric Composition Satellite (NASA); also

referred to as OV3-5, OV3-6

AT+T American Telephone & Telegraph
ATDA Alternate Target Docking Adapter

ATM atmosphere

ATS Applications Technology Satellite (NASA)

AU astronomical unit

AVCS advanced vidicon camera system

AVG average

AVHRR advanced very high resolution radiometer
AWRE Atomic Weapons Research Establishment

BCD binary coded decimal

BE Beacon Explorer (satellite, NASA); beryllium

BERK Berkeley

BEV billion electron volts
BIC barium iodide cloud

BIOS Biological Satellite (NASA)

BPI bits per inch
BPS bits per second

BTL Bell Telephone Laboratories
BUY backscatter ultraviolet

BV billion volts B/W black and white

CAL calorie

CAV

CALSPHERE calibration sphere

CAL TECH California Institute of Technology

CAS Cooperative Applications Satellite (France-NASA);

also referred to as EOLE composite analog video

CDA command and data acquisition (station)

CDC Control Data Corporation

CDS cadmium sulfide

CENS Centre d'Etudes Nucleaires de Saclay

CM command module; centimeter

CNES Centre National d'Etudes Spatiales

CNET Centre National d'Etudes des Telecommunications CNRS Centre National de la Recherche Scientifique

COMS see COMSAT

COMSAT Communications Satellite Corporation

CORSA Cosmic-Ray Satellite (Japan) COSPAR Committee on Space Research CPKF Cape Kennedy (also referred to as the Eastern Test Range) CPS cycles per second CPU central processing unit CRC Communications Research Center CRPL Central Radio Propagation Laboratories (later ITSA; formerly part of ESSA; now a subdivision of NOAA) CRREL Cold Region Research & Engineering Laboratories CRT cathode ray tube CSI cesium iodide **CSM** command service module DAC data acquisition camera DANISH INST Danish Institute for Space Research SPACE RSCH DASA

DANISH INST
SPACE RSCH

DASA
Defense Atomic Support Agency
DATS
Despun Antenna Test Satellite (DOD)
DB
decibe1
DCP
data collection platform(s)
DCS
direct couple system
DEG

DANISH INST
Danish Institute for Space Research
Support Agency
Despun Antenna Test Satellite (DOD)
decibe1
decibe1
degree

DENPA Density Phenomena (satellite, Japan)

DFVLR Deutsche Forschung und Versuchzanstalt für Luft-und Raumfahrt; English translation, Research Laboratory

for Aeronautics and Astronautics, Germany

DIAL/MIKA Diament Allemande/Mini Kapsel (satellite, Germany-France,

joint project)

DIAL/WIKA Diament Allemande/Wissenschaftliche Kapsel (satellite, Germany-France, joint project)

DIAM diameter

DIAPO Diapason (satellite, France)
DIT Drexel Institute of Technology

DME-A Direct Measurements Explorer A (satellite, NASA)

DOD Department of Defense

DODGE Department of Defense Gravity Experiment (satellite, DOD)

DRID direct readout image dissector (camera system)

DRIR direct readout infrared radiometer

DRTE Defence Research Telecommunications Establishment

(now CRC)

DSCS Defense Satellite and Communications System (DOD)
DSIR Department of Science and Industrial Research

DV digital video

E energy

EASEP Early Apollo Scientific Experiment Package

EGO Eccentric (Orbiting) Geophysical Observatory (satellite,

NASA)

EL electric

ELDO European Launch Development Organization

ELECTRO-OPT Electro-Optical Systems, Inc.

SYS

EME environmental measurement experiment

ENV RSCH Environmental Research & Technology, Inc.

+ TECH INC

EOF end-of-file

EOGO Eccentric Orbiting Geophysical Observatory (satellite,

NASA)

EPE Energetic Particle Explorer (satellite, NASA)

E/O energy per unit charge

ERB earth radiation budget (experiment)

ERDC Earth Resources Data Center

ERGS Earth Geodetic Satellite (USAF-USA)
ERL Environmental Research Laboratory (NOAA)
ERS Environmental Research Satellite (USAF)
ERTS Earth Resources Technology Satellite (NASA)

ESGEO see GEOS

ESMR electrically scanning microwave radiometer

ESOC European Space Operations Centre
ESRO European Space Research Organization

ESSA Environmental Science Service Administration (now NOAA)

ESTEC European Space Technology Center

ETR Eastern Test Range (also referred to as Cape Kennedy)

EUV extreme ultraviolet

EV electron volt

EVA extravehicular activity

EVM earth viewing (equipment) module EXOS Exospheric Satellite (Japan)

FARO Flare-Activated Radiobiological Observatory

FLT-SAT Fleet Satellite (USN) FM frequency modulation

FMRT final meteorological radiation tape(s)

FOV field of view

FPR flat plate radiometer

FR French Research (satellite, France)

FRC Flight Research Center (NASA)

FSK frequency shift key

FWS filter wedge spectrometer

GARP Global Atmospheric Research Program GE General Electric (Company) .GE. greater than or equal to **GEMS** Geostationary European Meteorological Satellite (ESRO) GEOPHYSICS Geophysics Corporation of America CORP GEOS Geodetic Earth-Orbiting Satellite (NASA); Geostationary Earth-Orbiting Satellite (ESRO) G.E.T. ground elapsed time GGSE gravity gradient stabilization experiment GGTS Gravity Gradient Test Satellite (NASA) GHZ gigahertz GISS Goddard Institute for Space Studies (NASA) GM Geiger-Mueller; gram GMT Greenwich Mean Time GOES Geosynchronous Operational Environmental Satellite (NASA) (also called SMS) GRE ground reconstruction equipment GREB Galactic Radiation Experiment Background (Navy transit satellite) GRI Groupe de Recherche Ionospherique GRS German Research Satellite (NASA-Germany) GSCHAFT FUR-Geselschaft fur Weltraumforschung (Center for Space WELTFORSCH Research, Germany) GSFC Goddard Space Flight Center (NASA) GSM geocentric solar magnetospheric .GT. greater than GUGMS Glavnoye Upravleniye Gidrometeorologicheskoi Sluzhby (Main Administration of the Hydrometeorological Service, USSR) GV gigavolt GVHRR geosynchronous very high resolution radiometer HAO High Altitude Observatory HCO Harvard College Observatory HDRSS high data rate storage system HE helium HEAO High-Energy Astronomical Observatory (NASA) HEOS High-Eccentricity Earth-Orbiting Satellite (ESRO) HFE heat-flow experiment; heat-flow electronics HR high resolution; hour HRIR high-resolution infrared radiometer HRIRS high-resolution infrared radiation sounder

hertz (cycles per second)

HZ

IAP Institue of Atmospheric Physics
IBM International Business Machines
ICBM intercontinental ballistic missile

ICSU International Council of Scientific Unions

ID identification

IDC image dissector camera

IDCS image dissector camera system

IDCSP Initial (or Interim) Defense Communication Satellite

Program (or Project) (DOD)

IE Ionospheric Explorer (satellite, NASA-NBS)
IGRF International Geomagnetic Reference Field

IME International Magnetospheric Explorer (satellite,

NASA-ESRO)

IMP Interplanetary Monitoring Platform (satellite, NASA)

INDASAT Indian Scientific Satellite (ISRO-USSR)

INOP inoperable

INSAT Indian National Satellite (ISRO-USSR)

INST institute

INTA Instituto Nacional de Tecnica Aeronautica (Spain);

the National Institute of Aeronautical Science

INTASAT Satellite (INTA, Spain)

INTELSAT International Telecommunications Satellite (NASA-COMS)

ION COMP Ionospheric Composition (satellite--see DIAPO)
IPA Institute for Physics of the Atmosphere (SAS)

IQSY International Quiet Sun Year

IR infrared

IRBM intermediate range ballistic missile
IRIG Inter-Range Instrumentation Group
IRIS infrared-interferometer spectrometer

IRLS interrogation, recording, and location system

IRR infrared radiometry
IRTRN infrared transmission

ISAS Institute of Space & Aeronautical Science (Japan)
ISIS International Satellite for Ionospheric Studies

(NASA-Canada)

ISRO Indian Space Research Organization
ISS Ionospheric Sounding Satellite (Japan)

ITCZ intertropical convergence zone

ITOS Improved Tiros Operational Satellite (ESSA)
ITPR infrared temperature profile radiometer

ITR incremental tape recorder

ITSA Institute for Telecommunication Sciences and Aeronomy

(formerly a subdivision of ESSA; now NOAA)

IU instrument unit

IUE International Ultraviolet Explorer (satellite,

NASA-UK-ESRO, joint project)

JOB Johannesburg, South Africa JPL

Jet Propulsion Laboratories (NASA)

**JSC** Johnson Space Center (NASA)

KBS kilobits per second KEV kiloelectron volt

KG kilogram KHZ kilohertz KΜ kilometer

KP magnetic activity index  $K_{\mathbf{p}}$ KPNO Kitt Peak National Observatory

KSC John F. Kennedy Space Center (NASA)

LA Los Angeles LAB laboratory

LAGEOS Laser Geodetic Earth-Orbiting Satellite (NASA-MSFC)

LARC Langley Research Center (NASA)

LAS Large Astronomical Satellite (ESRO) LASL Los Alamos Scientific Laboratory

LCS Lincoln Calibration Sphere .LE. less than or equal to LEM lunar excursion module

**LEPEDEA** low-energy proton and electron differential energy

analyzer

LERC Lewis Research Center (NASA)

LES Lincoln Experimental Satellite (DOD) (Lincoln

Laboratory, MIT) Lincoln Laboratory

LM lunar module

LL

LMD Laboratory of Meteorological Dynamics LOCKHEED Lockheed Palo Alto Research Laboratory

LOFTI Low-Frequency Trans-Ionospheric Satellite (USN-NRL)

LOGACS Low-G Accelerometer Calibration System (USAF)

LRC Lewis Research Center

LRIR limb radiance inversion radiometer; low-resolution

infrared radiometer

LRL Lunar Receiving Laboratory

LRV lunar roving vehicle

LT. less than

LTV Ling-Temco-Vought (company)

meter, milli- (prefix) M Mercury Atlas MA Madrid, Spain MAD Modified Advanced Research Environmental Test MARENTS Satellite (USAF) Ministry of Aviation Supply, UK MAS magnetic attitude spin coil MASC megacycle MC McDonnell-Douglas Corporation M-D Meteoroid Technology (satellite, NASA) METEC million electron volts MEV milligram MG megahertz MHZ Missile Defense Alarm System (USAF) MIDAS MIN Massachusetts Institute of Technology MIT millimeter Max Planck Institute for Extraterrestrial Physics MPI, GARCHING Max Planck Institute for Nuclear Physics MPI, HEIDELBG Max Planck Institute for Aeronomy --- Max Planck MPI, LINDAU Institute for Stratospheric Physics medium resolution MR medium-resolution infrared radiometer MRIR microsecond MS Manned Spacecraft Center (now Johnson Space Center) MSC millisecond MSEC Marshall Space Flight Center (NASA) MSFC Magnetic Storm Satellite (AFCRL-NASA); multispectral MSS scanner multicolor spin-scan cloudcover camera MSSCC Meteoroid Technology Satellite (NASA) MTS Mullard Space Science Laboratory, Dorking, Surrey, UK MULLARD SS

monitor of ultraviolet solar energy MUSE

milliwatt ΜW

Nimbus/ATS Data Utilization Center (now NESS) NADUC National Aeronautics and Space Administration NASA (Washington, D.C., headquarters)

NASA OFFICES:

NASA Office of Applications NASA-OA

NASA Office of Advanced Research and Technology NASA-OART NASA Office of Aeronautics and Space Technology NASA-OAST

NASA Office of Manned Space Flight NASA-OMSF

NASA Office of Space Science NASA-OSS

NASA Office of Space Science and Applications (now two NASA-OSSA

separate offices)

NASA Office of Tracking and Data Acquisition NASA-OTDA

NASA Research Centers: NASA-ARC NASA-Ames Research Center NASA-FRC NASA-Flight Research Center NASA-GISS NASA-Goddard Institute for Space Studies NASA-GSFC NASA-Goddard Space Flight Center NASA-JPL NASA-Jet Propulsion Laboratory NASA-JSC NASA-Johnson Space Center NASA-KSC NASA-John F. Kennedy Space Center NASA-LARC NASA-Langley Research Center NASA-LERC NASA-Lewis Research Center NASA~MSFC NASA-Marshall Space Flight Center NASA-WS NASA-Wallops Station NASC National Aeronautics and Space Council NASDA National Space Development Agency NATL RSCH National Research Council, Italy CNCL, ITALY NATO North Atlantic Treaty Organization NBS National Bureau of Standards NCAR National Center for Atmospheric Research NCC National Climatic Center NDRE Norwegian Defence Research Establishment NEMS Nimbus-E Microwave Spectrometer; Near-Earth Magnetospheric Satellite (ESRO) NESC National Environmental Satellite Center (now NESS) NESS National Environmental Satellite Service (NOAA) NETHERLANDS Netherlands Institute of Nuclear Physics Research INST NHC National Hurricane Center NIH National Institutes of Health NMC National Meteorological Center NMRT Nimbus meteorological radiation tape NNSS Navy Navigational Satellite System NOAA National Oceanographic and Atmospheric Administration (formerly ESSA) NORAD North American Air Defense Command NORWEGIAN Norwegian Institute of Cosmic Physics INST NOTS CHLAKE Naval Ordnance Test Station, China Lake NRC National Research Council NRL Naval Research Laboratory NSA National Security Agency

National Weather Records Center (presently NCC)

National Science Foundation

Naval Weapons Laboratory

National Space Science Data Center

NSF

NWL

NWRC

NSSDC

OAO Orbiting Astronomical Observatory (satellite, NASA-GSFC)

OAR Office of Aerospace Research (USAF)

OBS observatory

OCC OPLE Command Center

OFO Orbiting Frog Otolith (NASA experimental spacecraft)
OGO Orbiting Geophysical Observatory (satellite, NASA)

OI other investigator

OMNI low-resolution omnidirectional radiometer (on Explorer 7)

ONR Office of Naval Research

OP OFF operational off

OPEP orbital-plane experiment package

OPLE Omega position and location experiment

ORBIS Orbiting Radio Beacon Ionospheric Satellite (NASA)
ORS Octahedral Research Satellite (NASA); Orbiting

Research Satellite

OSO Orbiting Solar Observatory (satellite, NASA-GSFC)

OT Operational Tiros (satellite, NASA-GSFC)

OV Orbiting Vehicle (satellite, USAF)

PAC Package Attitude Control (satellite, NASA-GSFC)
PAGEOS Passive Geodetic Earth-Orbiting Satellite (NASA)

PAM pulse amplitude modulation pulse coded modulation

PEP platform electronic packages
PFM pulse frequency modulation

PHASR Personnel Hazards Associated with Space Radiation

(satellite, USAF)

PI principal investigator

PIXEL picture element

pM pulse modulation; photomultiplier

PMR pressure modulation radiometer; Pacific Missile Range

PMT photomultiplier tube

P-N positive-negative (junction)

POGO Polar Orbiting Geophysical Observatory (satellite, NASA)

pps pulse per second

PSE passive seismograph experiment
PTL Photographic Technology Laboratory

QOMAC quarter-orbit magnetic attitude control (system)

QUI Quito, Ecuador

R&D research and development

RA Ranger

RAD radian, radiation

RADCAT Radar Calibration Target (satellite, ARPA)

RAE Radio Astronomy Explorer (NASA-GSFC) RAM random access measurement (system) RBV

return beam vidicon (camera) RC

resistance capacitor

**RCA** Radio Corporation of America

REXS Radio Exploration Satellite (Japan)

RF radio frequency

RM Radiation Meteoroid (satellite, NASA-OART)

**RMS** root mean square; also, see RM

ROS Rosman, North Carolina **RPM** revolutions per minute RPS revolutions per second RRL Radio Research Laboratories

RSCH research

RSRS Radio and Space Research Station RTG radioisotope thermoelectric generator

RTTS real-time transmission system

SAMOS Satellite Mission Observation System

**SAMSO** Space and Missile Systems Organization (USAF)

SAO Smithsonian Astrophysical Observatory

SAS Small Aeronomy Satellite (NASA); Soviet Academy of

SATAR Satellite for Aerospace Research (NASA); OV1-2

SBRC Santa Barbara Research Center SCAMS scanning microwave spectrometer SCEL

Signal Corps Engineering Laboratories SCMR surface composition mapping radiometer

SCR selective chopper radiometer SE Solar Explorer (satellite, NASA)

SEC second; secondary electron conduction (vidicon tube) SECOR Sequential Collation of Range (satellite, USAF-USA)

SEM space environment monitor

SERT Spinning Satellite for Electric Rocket Test (NASA-LERC)

SESP Space Experiment Support Program

**SESPO** Space Environmental Support Project Office

SHS Soviet Hydrometeorological Service SIBS Salk Institute for Biological Studies

SIM scientific instrument module SIRS satellite infrared spectrometer

SKA Fairbanks, Alaska

San Marco (satellite, NASA-Italy) SM

SMS Synchronous Meteorological Satellite (NASA)

SNAP systems for nuclear auxiliary power

SNT Santiago, Chile

SOEP solar-oriented experiment package SOLRAD Solar Radiation (satellite, NASA)

SPM solar proton monitor

SR Solar Radiation (satellite, NASA); scanning radiometer

SRATS Solar Radiation and Thermospheric Structure

(satellite, Japan)

SRC Space Research Council, UK SRI Stanford Research Institute SSCC spin-scan cloudcover camera

SSD Space Sciences Division (Jet Propulsion Laboratory)

SSS Small Scientific Satellite (NASA)

STADAN Space Tracking and Data Acquisition Network

STARAD Starfish Radiation (satellite, NASA)

STER steradian

STL Space Technology Laboratories (now TRW Systems Group)
STP Solar Terrestrial Probe (also known as HELIOCENTRIC

or IME-4, satellite, NASA-GSFC)

SUI State University of Iowa (now University of Iowa)
SURCAL Surveillance Calibration (satellite, DOD-NRL)

SW CTR ADV Southwest Center for Advanced Studies

STUDIES

SWRF Sine Wave Response Filter (program)

SYNCOM Synchronous Communication Satellite (NASA-GSFC)

TGDR tracking & data relay

TAC Technology Application Center

TACOMSAT Tactical Communications Satellite (DOD)
TACSAT Tactical Communications Satellite (DOD)

TATS Test and Training Satellite (NASA)

TD Thor-Delta (satellite, ESRO); launch vehicle (NASA-USAF)

TDP Tracking Data Processor (program)

TEC telemetry and command; transearth coast (Apollo program)

TECH technical

TEI transearth injection temporal; temperature

TETR Test and Training (satellite, NASA)
THIR temperature-humidity infrared radiometer
THORAD-AGE Thor Augmented Delta Agena (launch vehicle)

TIMATION Time Location System (USN)

TIROS Television and Infrared Observation Satellite (NASA)

TLI translunar injection

TOPS Thermal Noise Optical Optimization Communication

System (NASA)

TOPSI topside (sounder) (satellite, NASA)

TOS Tiros Operational Satellite (or System) (NASA)

TOVS Tiros operational vertical sounder

TRAAC Transit Research and Attitude Control (satellite, USN)

TRS Tetrahedral Research Satellite (USAF)

TRW Systems Group

TTS Test and Training Satellite (NASA); also called TATS,

TETR

TWERLE tropical wind energy conversion and reference level

experiment -

U OF CALIF, University of California at Berkeley

BERK

U OF CALIF, University of California at Los Angeles

LA

U OF CALIF, University of California at Riverside

RIVER

U OF CALIF, University of California at San Diego

SD

UCLA University of California at Los Angeles

UHF ultra-high frequency
UK United Kingdom

UK United Kingdom
USA United States Army

US TOPO CMD United States Army Topographic Command USA TOPO COM United States Army Topographic Command USAECOM United States Army Electronics Command

USAF United States Air Force

USAF United States Air Force Aeropropulsion Laboratory

AEROPROPUL

USAF MAT LAB United States Air Force Materials Laboratory

USAF MED United States Air Force Medicine, Wright Patterson AFB

USAF SAMSO United States Air Force Space and Missile Systems

Organization

USAF SCH OF United States Air Force School of Aerospace Medicine,

AEROS MED Brooks AFB

USN United States Navy

USN AEROS MED United States Navy Aerospace Medicine Research Laboratory

RSCH LAB

UT universal time UV ultraviolet

UVS ultraviolet spectrometer

y volt

VAR variation

VHF very high frequency

VHRR very high resolution radiometer

VISSR visible infrared spin-scan radiometer

VLF very low frequency

VNBC Vandenberg AFB (also referred to as WTR, Western

Test Range)

VTPR vertical temperature profile radiometer

W watt

WALI Wallops Island

WBVTR wideband video tape recorder

WDC World Data Center WEFAX weather facsimile

WKG GRP SPC Working Group for Space Physics Research

PHYS RSCH

WMO World Meteorological Organization

WNK Winkfield, England WPM words per minute

WRESAT Weapons Research Establishment Satellite (Australia)

WS Wallops Station (NASA)
WSMR White Sands Missile Range

WTR Western Test Range (also referred to as VNBC,

Vandenberg AFB)

WWW World Weather Watch

Z atomic number

Active Spacecraft and Experiments

# SECTION 1 - DESCRIPTIONS OF ACTIVE SPACECRAFT AND EXPERIMENTS

This section contains descriptions of spacecraft and experiments pertinent to this Report that were active as of September 30, 1973, and for which NSSDC has at least minimal documentation. All descriptions included in this section are ordered chronologically by NSSDC ID Code, which appears in the upper right-hand corner of the description.

Each spacecraft or experiment entry in this section is composed of three parts -- a heading, a brief description, and an indication of status and data acquisition rate. The headings list characteristics of satellites and experiments, respectively. The status information is based on quarterly reports from various spacecraft project offices, as well as personal contacts with the experimenters.

# Contents of Spacecraft Entries

The heading for each spacecraft description in this section includes two sets of orbit parameters, i.e., initial orbit parameters calculated shortly after launch and recent orbit parameters. Each set of parameters consists of epoch date, orbit type, orbit period, apoapsis, periapsis, and inclination for the spacecraft. In addition, the heading contains the spacecraft weight in orbit, launch date, launch site, launch vehicle, spacecraft common and alternate names, funding agency (funding country and agency), and spacecraft personnel (project manager and project scientist). The spacecraft brief description is immediately below each heading.

The last reported change in spacecraft status and data acquisition rate is given following the spacecraft brief description. The spacecraft status is given as either "NORMAL" or "PARTIAL," while the spacecraft data acquisition rate is given as either "STANDARD" or "SUBSTANDARD."

# Contents of Experiment Entries

Each experiment entry heading includes the experiment name and the name and address of the principal investigator for the experiment as well as other investigators associated with the experiment. The experiment brief description is immediately below each heading. The last reported change in the experiment status and data acquisition rate follows the experiment brief description. The experiment status is given as either "NORMAL" or "PARTIAL," and the experiment data acquisition rate is given as "STANDARD" or "SUBSTANDARD." The last reported change in spacecraft status and data acquisition rate is also repeated here for the reader's convenience.

#### NATIONAL SPACE SCIENCE DATA CENTER ACTIVE SPACECRAFT AND EXPERIMENTS

SPACECRAFT COMMON NAME- PIONEER 6
ALTERNATE NAMES- PIONEER-A, 01841

NSSDC ID 65-105A

LAUNCH DATE- 12/16/65

SPACECRAFT WEIGHT IN ORBIT-

63.4 KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NASA-OSSA

INITIAL ORBIT PARAMETERS

APOAPSIS- .936 AU RAD PERIAPSIS- .6143 AU RAD INCLINATION- .1639 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 12/16/65 ORBIT TYPE- HELIOCENTRIC CRBIT PERIOD- 311.3 DAYS
APOAPSIS- .936 AU RAD PERIAPSIS- .8143 AU RAD INCLINATION- .1639 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.F. HALL

NASA-ARC

MOFFETT FIELD, CA

PS - J.H. WOLFE NASA-ARC

MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 6 WAS THE FIRST IN A SERIES OF SULAR-CREITING. SPIN-STABILIZED. AND SOLAR-CELL AND BATTERY-POWERED SATELLITES CESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. ITS EXPERIMENTS STUDIED THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 50 RPM. AND THE SPIN AXIS WAS PERPENCICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND. ONE OF FIVE BIT RATES. ONE OF FOUR DATA FORMATS. AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512. 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS FOR USE AT THE TWO HIGHEST BIT RATES. ANOTHER WAS FOR USE AT THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY REACCUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR. AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BLT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE WAS 512 BPS FROM DECEMBER 16, 1965 TO FEBRUARY 28, 1966, 256 BPS FROM MARCH 1, 1966 TO MARCH 17, 1966, 64 BPS FROM MARCH 18, 1966 TO APRIL 13, 1966, 16 BPS FROM APRIL 14. 1966 TO MAY 9, 1966, 8 BPS FROM MAY 10. 1966 TO DECEMBER 1970. AND 16 BPS FROM DECEMBER 1970 TO JULY 1571. THE SPACECRAFT WAS IN THE VICINITY OF THE EARTH UNTIL MID-1972. WHICH ALLDWED HIGHER BIT RATES TO BE UTILIZED.

THE REAL-TIME TRANSMISSION MODE WAS USED PREDOMINANTLY THROUGHOUT THE FLIGHT WHEN TRACKING STATIONS WERE AVAILABLE. BETWEEN TRACKING PERIODS. THE DUTY CYCLE STORE MODE WAS GENERALLY USED. DATA COVERAGE AMOUNTED TO ALMOST 100 PERCENT FOR THE FIRST 23 WEEKS AFTER LAUNCH. THEN THE COVERAGE CROPPED TO BETWEEN 10 AND 20 PERCENT UNTIL JULY 1970, AT WHICH TIME THE SPACECRAFT WAS AGAIN ABLE TO BE RECEIVED ON THE SMALLER ANTENNAS SO THAT DATA COVERAGE ROSE TO BETWEEN 20 AND 50 PERCENT. PIONEER 6 LEFT THE VICINITY OF THE EARTH. PASSING THROUGH THE BOW SHOCK AT A LOCAL TIME NEAR 6 P.M. THE SPACECRAFT SPIN RATE HAS REMAINED CLOSE TO NOMINAL AS OF JULY 1971. A LEAK IN THE ATTITUDE GAS SYSTEM PREVENTED FURTHER ATTITUDE CORRECTIONS FOLLOWING AN ADJUSTMENT MADE ON JUNE 9, 1966. HOWEVER. THE SENSORS THAT DETERMINED THE SPIN AXIS DIRECTION CONTINUED TO WORK AND INDICATED THAT THE SPIN AXIS DIRECTION REMAINED CLOSE TO NOMINAL AS OF JULY 1971. THE MAGNETOMETER EXPERIMENT HAS BEEN INOPERABLE SINCE JULY 1970.

ON 02/07/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR WIND PLASMA FARADAY CUP

NSSDC ID 65-105A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=CTHER INVESTIGATOR)
PI - H.S. BRIDGE MIT CAMBRIDGE: MA
DI - A.J. LAZARUS MIT CAMBRIDGE: MA

#### EXPERIMENT BRIEF DESCRIPTION

A MULTIGRID FARADAY CUP WITH THO SEMICIRCULAR. COPLANAR COLLECTORS WAS USED TO STUDY SOLAR WIND IONS AND ELECTRONS. THE INSTRUMENT HAD 14 CONTIGUOUS, ENERGY-PER-CHARGE (E/Q) CHANNELS BETWEEN 75 AND 9485 V FOR POSITIVE IONS AND FOUR ENERGY-PER-CHARGE CHANNELS BETWEEN 90 AND 1580 V FOR ELECTRONS. THE INSTRUMENT VIEW AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS AND PARALLEL TO THE ECLIPTIC PLANE. THE LINE SEPARATING THE TWO COLLECTORS LAY IN THE ECLIPTIC PLANE, ENABLING A ROUGH DETERMINATION OF SOLAR WIND BULK FLOW PERPENDICULAR TO THE ECLIPTIC PLANE. DURING EVERY SECOND SPACECRAFT ROTATION AND AT ONE VILTAGE LEVEL. THE SUM OF THE CURRENTS FROM THE COLLECTORS WAS OBTAINED IN 28 CONTIGUOUS 11.25-DEG ANGULAR SECTORS (FROM -45 DEG TO 270 DEG. WITH 0 DEG BEING THE SPACECRAFT-SUN LINE). THE EIGHT MEASUREMENTS ABOUT THE SUN-EARTH LINE (-45 DEG TO +45 DEG) WERE TELEMETERED. BUT ONLY THE LARGEST MEASUREMENT IN EACH SUCCEEDING 45-DEG INTERVAL (45 DEG TO 270 DEG) WAS TELEMETERED. IN ADDITION. DURING THIS ROTATION. THE CURRENT FROM ONE OF THE COLLECTORS WAS MEASURED IN ALL TWENTY-EIGHT 11.25-DEG SECTORS: AND THE LARGEST WAS IDENTIFIED AND TELEMETERED (BOTH MAGNITUDE AND SECTOR). A COMPLETE SET OF POSITIVE ION MEASUREMENTS AND ONE ENERGY CHANNEL OF ELECTRON MEASUREMENTS WERE COMPLETED EVERY 32 SEC. THE TIME BETWEEN EACH 32-SEC GROUP OF MEASUREMENTS VARIED WITH THE BIT RATE. FOR A MORE COMPLETE DESCRIPTION. SEE J. GEOPHYS. RES., 71. 3787-3791, AUGUST 1966.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

NSSDC ID 65-105A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)
PI - C.Y. FAN U OF ARIZONA TUCSON, AZ
OI - J.A. SIMPSON U OF CHICAGO CHICAGO, IL

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED A CHARGED PARTICLE TELESCOPE COMPOSED OF FOUR SILICON SOLID-STATE DETECTORS TO STUDY THE ANISOTROPY AND FLUCTUATIONS OF SOLAR PROTONS AND ALPHA PARTICLES. THE PROTON ENERGY RANGES SAMPLED WERE 0.6 TO 13.9 MEV. 13.9 TO 73.2 MEV, 73.2 TO 175 MEV. AND E.GT. 175 MEV. (CORRESPONDING TO DETECTOR CO INCIDENCES D 1NO TD 2NO TD 4. D1D 2NO TD 3 NO TD 4. D1D 2D 3NO TD 4. AND NOT D1D 2D 3NO TD 4. D1D 2D 3NO TD 4. AND NOT D1D 2D 3NO TD 4. D1D 2D 3NO TD 4. AND NOT D1D 2D 3NO TD 4. AND E.GT. 293 MEV. (CORRESPONDING TO THE FIRST THREE DETECTOR CO INCIDENCES GIVEN ABOVE). THE TIME RESOLUTION RANGED FROM ABOUT DNE MEASUREMENT PER 0.4 SEC TO ABOUT DNE MEASUREMENT PER 28 SEC DEPENDING ON THE TELEMETRY BIT RATE. THE DETECTOR WAS MOUNTED SO THAT IT MADE A 360-DEG SCAN IN THE ECLIPTIC PLANE ABOUT ONCE PER SECOND. PULSE HEIGHT ANALYSIS OF CETECTOR D1 OUTPUT (128 CHANNEL) AND D3 OUTPUT (32 CHANNEL) WAS ACCOMPLISHED FOR THE LAST EVENT PRICE TO EACH TELEMETRY READOUT FOR THE EXPERIMENT. THE D3 DETECTOR FAILED ON OCTOBER 22. 1967. THE D4 DETECTOR PERFORMED INTERMITTENTLY UP TO LATE 1969.

ON 02/07/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 10/22/67, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TWO-FREQUENCY RADIO RECEIVER

MSSDC ID 65-105A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - V.R. ESHLEMAN STANFORD U STANFORD, CA
GI - T.A. CROFT STANFORD U STANFORD, CA

#### EXPERIMENT BRIEF DESCRIPTION

BUTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 46-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY LENGTHENED BY ELECTRONS ALONG THE PATH. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELCCITY WAS ALSO OBSERVED. AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES. THE IGNOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS SEE 68-100A-03, 67-123A-03, 66-075A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 71. P. 3325-3327, AND IN RADIO SCIENCE, VOL. 6, P. 55-63.

ON 02/07/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY DETECTION

NSSDC ID 65-105A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - K.G. MCCRACKEN U OF ADELAIDE ADELAIDE, AUSTRALIA

OI - W.C. BARTLEY U OF TEXAS DALLAS, TX

OI - U.R. RAO U OF TEXAS DALLAS, TEXAS

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED PRIMARILY TO MEASURE THE DIRECTIONAL CHARACTERISTICS OF GALACTIC AND SOLAR COSMIC-RAY FLUXES. THE PARTICLE DETECTOR WAS A (SI (TL) SCINTILLATOR CRYSTAL THAT WAS SET INTO AN ANTICOINCIDENCE PLASTIC SCINTILLATOR COLLIMATOR CUP. SEPARATE PHOTOMULTIPLIER TUBES VIEWED THE TWO SCINTILLATORS. PULSES FROM THE CSI CRYSTAL UNACCOMPANIED BY PULSES FROM THE PLASTIC SCINTILLATOR WERE SORTED BY A THREE-WINDOW PULSE HEIGHT ANALYZER, THE WINDOWS CORRESPONDING TO ENERGY DEPOSITIONS OF 7.4 TO 44.0. 44.0 TO 77.1. AND 123.8 TO 303.8 MEV. COUNTS IN THE TWO LOWER ENERGY WINDOWS WERE DUE MAINLY TO PROTORS WITH THE WINDOW ENERGIES. WHILE ONLY PARTICLES OF Z GREATER THAN OR EQUAL TO 2 CONTRIBUTED TO THE HIGHEST ENERGY WINDOW COUNT RATE. (PROTONS ABOVE 90 MEV GAVE ANTICOINCIDENCE PULSES.) FOR EACH ENERGY WINDOW. COUNTS WERE SEPARATELY ACCUMULATED IN EACH OF FOUR ANGULAR SECTORS AS THE SPACECRAFT SPUN. EACH ANGULAR SECTOR WAS NORMALLY 89.5 DEG IN WIDTH, WITH THE SUN IN THE MIDDLE OF ONE SECTOR. HOWEVER, WHEN LARGE FLUXES WERE ENCOUNTERED. EACH ANGULAR SECTOR WAS REDUCED TO 11.2 DEG. WITH THE SUN NEAR THE MIDPOINT BETWEEN TWO SECTORS. A SPIN-INTEGRATED (ISOTROPIC) MODE, IN WHICH ALL PARTICLES DEPOSITING 7.4 MEY IN THE CSI CRYSTAL (NO ANTICOINCIDENCE REQUIREMENT) WERE COUNTED. WAS ALSO USED. ACCUMULATION TIMES FOR EACH OF THE 12 DIRECTIONAL MODES AND FOR THE OMNIDIRECTIONAL MODE VARIED BETWEEN 14 SEC AND 112 SEC (SPACECRAFT SPIN PERIOD WAS ABOUT 1 SEC) DEPENDING ON THE TELEMETRY BIT RATE. SEE THE SPACECRAFT BRIEF DESCRIPTION (65-105A) FOR INFORMATION ON PERCENT TIME COVERAGE VS TIME. SEE BARTLEY ET AL., REV. SCI. INSTRUM., 38, PAGE 266. 1967. FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 02/07/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/07/71, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- PIONEER 7
ALTERNATE NAMES- PIONEER-8, 02398

NSSDC ID 66-075A

LAUNCH DATE- 08/17/66

SPACECRAFT WEIGHT IN ORBIT-

63.4 KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NASA-OSSA

INITIAL ORBIT PARAMETERS

APDAPSIS- 1.1250 AU RAD PERIAPSIS- 1.0100 AU RAD INCLINATION- .09767 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 08/17/66 DRBIT TYPE- HELIGCENTRIC GRBIT PERIOD- 402.9 DAYS
APDAPSIS- 1.1250 AU RAD PERIAPSIS- 1.0100 AU RAD INCLINATION- .09767 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.F. HALL

NA SA-ARC

MOFFETT FIELD. CA

PS - J.H. WOLFE NASA-ARC

MOFFETT FIELD. CA

### SPACECRAFT BRIEF DESCRIPTION

PIONEER 7 WAS THE SECOND IN A SERIES OF SOLAR-ORBITING. SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND. THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT). SOLAR AND GALACTIC COSMIC RAYS. AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT AEOUT 60 RPM. AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED APPROXIMATELY TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF 32 SEVEN-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED FOR THE TWO HIGHEST BIT RATES. ANOTHER WAS USED FOR THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIC PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE. DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE. A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR. AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM AUGUST 17, 1966. TO OCTOBER 23, 1966, 256 BPS FROM OCTOBER 25, 1966, TO NOVEMBER 6, 1966, 64 BPS FROM NOVEMBER 9, 1966, TO DECEMBER 16, 1966, 16 BPS FROM DECEMBER 16, 1966, TO MAY 15, 1967, AND 8 BPS FROM MAY 15, 1967, AND THEREAFTER, HIGHER BIT RATES WERE POSSIBLE WHEN THE SPACECRAFT WAS BEING TRACKED BY THE 64-M ANTENNA. BUT THE DATA COVERAGE AT THESE TIMES WAS LOW. BY FEBRUARY 1968, ALL REAL-TIME DATA WERE BEING RECEIVED AT 8 BPS. DATA COVERAGE AVERAGED BETWEEN 50 AND 100 PERCENT COVERAGE FOR THE FIRST 30 WEEKS AFTER LAUNCH. THE DATA COVERAGE THEN FELL TO BETWEEN 20 AND 30 PERCENT UNTIL SEPTEMBER 1968. AFTER THIS TIME, IT DROPPED TO BETWEEN 0 AND 20 PERCENT THROUGH JULY 1971. REAL-TIME TRANSMISSION WAS GENERALLY USED WHEN TRACKING STATIONS WERE AVAILABLE. OTHERWISE, THE DUTY CYCLE STORE MODE WAS USED. SOMETIME BETWEEN FEBRUARY 9. 1969. AND FEBRUARY 16. 1969. THE SUN SENSOR THAT GENERATED THE SPACECRAFT SUN PULSES FOR ONBOARD SECTORING OF EXPERIMENTS FAILED. HOWEVER. THE REMAINING SUN SENSORS CONTINUED TO FUNCTION. THUS PERMITTING DETERMINATION OF THE SPIN AXIS DIRECTION UNTIL ABOUT JANUARY 1972. PICNEER 7 LEFT THE

VICINITY OF THE EARTH PASSING THROUGH THE LUNAR DISTANCE AT A LOCAL TIME OF ABOUT 3 A.M. THE MAGNETOMETER EXPERIMENT HAS BEEN INOPERABLE SINCE JANUARY 1969. THE TWO-FREQUENCY BEACON WAS PUT IN AN OPERATIONAL OFF MODE ON APRIL 1. 1967. THE CELESTIAL MECHANICS EXPERIMENT WAS PUT IN AN OPERATIONAL OFF MODE IN JULY 1970. THE SUPERIOR CONJUNCTION FARADAY ROTATION EXPERIMENT WAS PUT IN AN OPERATIONAL OFF MODE IN NOVEMBER 1971. AND THE FARADAY CUP EXPERIMENT BECAME INOPERABLE IN NOVEMBER 1972.

ON 08/17/66. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC ID 66-075A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR)
PI - J.H. WOLFE NASA-ARC MOFFETT FIELD. CA

### EXPERIMENT BRIEF DESCRIPTION

A QUADRISPHERICAL ELECTROSTATIC ANALYZER WITH EIGHT CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 16 LCGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FRCM 200 TO 10.000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN EIGHT LOGARITHMICALLY EQUISPACED ENERGY PER CHARGE STEPS RANGING FROM 0 TO 500 V. THE EIGHT COLLECTORS MEASURED PARTICLES INCIDENT FROM EIGHT DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). THERE WERE FOUR 15-DEG INTERVALS, TWO 20-DEG INTERVALS, AND TWO 30-DEG INTERVALS. AS THE SPACECRAFT WAS SPINNING. FLUXES WERE MEASURED IN 15 AZIMUTHAL ANGULAR SECTORS. EIGHT OF THESE SECTORS WERE 5-5/8 DEG WIDE. WERE CONTIGUOUS. AND BRACKETED THE SCLAR DIRECTION. THE REMAINING SEVEN SECTORS WERE 45 DEG WIDE. THREE DIFFERENT MODES OF DATA COLLECTION WERE USED. AT THE HIGHEST BIT RATE (512 BPS), THE FULL SCAN MODE WAS ALTERNATED WITH THE MAXIMUM FLUX MODE AT EACH E/G STEP. IN THE FULL SCAN MODE. THE MAXIMUM FLUX OBSERVED IN EACH OF THE 15 AZIMUTHAL SECTORS AS THE SPACECRAFT ROTATED WAS RECORDED FOR A GIVEN SINGLE COLLECTOR AT A GIVEN E/Q STEP. DURING 24 SUCCESSIVE OPERATIONS OF THE FULL SCAN MODE (48 SPACECRAFT REVOLUTIONS). THE 16 ION E/Q STEPS AND EIGHT ELECTRON E/Q STEPS WERE EXERCISED FOR A GIVEN COLLECTOR. DURING EIGHT SUCCESSIVE SUCH PERIODS. EACH OF THE EIGHT COLLECTORS WAS EXERCISED. THE FULL CYCLE OF FULL SCAN MODE DATA REQUIRED 400 SPACECRAFT REVOLUTIONS (ABOUT 400 SEC). SUCH CYCLES WERE REPEATED WITHOUT INTERRUPTION AT THE HIGH BIT RATE. IN THE MAXIMUM FLUX MODE, FOR THE E/Q STEP USED IN THE PRECEDING REVOLUTION OF FULL SCAN MODE OPERATION. ALL COLLECTORS WERE OBSERVED FOR ONE REVOLUTION. AND THE MAXIMUM FLUX OBSERVED WAS REPORTED ALONG WITH THE NUMBER OF THE COLLECTOR THAT OBSERVED IT AND THE ANGULAR DIRECTION (2-13/16-DEG RESOLUTION) OF THE OBSERVATION. AT THE NEXT HIGHEST BIT RATE (256 BPS). THE SHORT SCAN MODE WAS ALTERNATED EVERY SPACECRAFT REVOLUTION WITH THE MAXIMUM FLUX MODE. THE SHORT SCAN MODE WAS THE SAME AS THE FULL SCAN EXCEPT THAT GNLY THE PEAK FLUX IN EACH OF THE EIGHT 5-5/8-DEG-WIDE AZIMUTHAL SECTORS WAS RECORDED. THUS. THIS CYCLE ALSO TOOK 400 SPACECRAFT REVOLUTIONS. AT THE LOW BIT RATES (64. 16. AND 8 BPS). THE MAXIMUM FLUX MODE ALONE WAS USEC. THUS, NO AZIMUTHAL DISTRIBUTIONS WERE MEASURED. AT THE LOW BIT RATES. IT TOOK 32 SEC FOR A COMPLETE SET OF ION MEASUREMENTS AND 16 SEC FOR A COMPLETE SET OF ELECTRON MEASUREMENTS. AT 64 BPS. THE ION AND ELECTRON MEASUREMENTS WERE TAKEN AND TELEMETERED EVERY 84 SEC. AT 16 BPS. THEY WERE TAKEN AND TELEMETERED EVERY 336 SEC. AT 8 BPS. THEY WERE TAKEN AND TELEMETERED EVERY 672 SEC.

ON DBZ177.66. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME SHORMAL WIND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/16/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSSDC ID 66-075A-05

1 - 6,000

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PI - K.G. MCCRACKEN U OF ADELAIDE ADELAIDE, AUSTRALIA

OI - W.C. BARTLEY U OF TEXAS DALLAS, TX

OI - U.R. RAO U OF TEXAS DALLAS, TEXAS

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED PRIMARILY TO MEASURE THE DIRECTIONAL CHARACTERISTICS OF GALACTIC AND SOLAR COSMIC RAY FLUXES. THE PARTICLE DETECTOR WAS A CSI (TL) SCINTILLATOR CRYSTAL THAT WAS SET INTO AN ANTICGINGIDENCE PLASTIC SCINTILLATOR COLLIMATOR CUP. SEPARATE PHOTOMULTIPLIER TUBES VIEWED THE TWO SCINTILLATORS. PULSES FROM THE CSI CRYSTAL THAT WERE NOT ACCOMPANIED BY PULSES FROM THE PLASTIC SCINTILLATOR WERE SORTED BY A THREE-WINDOW PULSE HEIGHT ANALYZER. THE WINDOWS CORRESPONDING TO ENERGY DEPOSITIONS OF 7.2 TO 47.4, 47.4 TO 64.5, AND 64.5 TO 81.2 MEV. NO FOSITIVE SPECIES IDENTIFICATION WAS MADE ALTHOUGH MOST OF THE COUNTS IN EACH WINDOW WERE USUALLY DUE TO PROTONS WITH THE WINDOW ENERGIES. FOR EACH ENERGY WINDOW. COUNTS WERE SEPARATELY ACCUMULATED IN EACH OF FOUR ANGULAR SECTORS AS THE SPACECRAFT SPUN. EACH ANGULAR SECTOR WAS NORMALLY 89.5 DEG IN WIDTH, WITH THE SUN EITHER NEAR A SECTOR BOUNDARY OR IN THE MIDDLE OF A SECTOR, DEPENDING ON THE OPERATING MODE. HOWEVER, WHEN LARGE FLUXES WERE ENCOUNTERED, EACH ANGULAR SECTOR WAS REDUCED TO 11.2 DEG. WITH THE SUN EITHER IN A SECTOR OR NEAR THE MICPOINT BETWEEN TWO SECTORS. A SPIN-INTEGRATED (ISOTROPIC) MODE. IN WHICH ALL FARTICLES DEPOSITING 7.2 MEY IN THE CSI CRYSTAL (NO ANTICOINCIDENCE REQUIREMENT) WERE COUNTED. WAS ALSO USED. ACCUMULATION TIMES FOR EACH OF THE 12 DIRECTIONAL MODES AND FOR THE OMNIDIRECTIONAL MODE VARIED BETWEEN 14 AND 112 SEC (SPACECRAFT SPIN PERIOD WAS ABOUT 1 SEC) DEPENDING ON THE TELEMETRY BIT RATE. DIRECTIONAL FLUX DATA RELIABILITY WAS REDUCED BY THE MALFUNCTION OF THE SUN PULSE MECHANISM BETWEEN FEBRUARY 9 AND FEBRUARY 16. 1969. OTHERWISE, THE INSTRUMENT FUCTIONED NORMALLY. OBTAINING USEFUL OMNIDIRECTIONAL DATA. UNTIL SPACECRAFT TRACKING WAS REDUCED TO A NEGLIGIBLE AMOUNT ON JULY 15. 1972. SEE THE SPACECRAFT BRIEF DESCRIPTION (66-0.75A) FOR INFORMATION ON PERCENT TIME COVERAGE VS TIME. SEE BARTLEY ET AL., REV. SCI. INSTRUM., 38. PAGE 266. 1967. FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 08/17/66, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/09/69, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY TELESCOPE

NSSDC ID 66-075A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR)
PI - J.A. SIMPSON U OF CHICAGO CHICAGO, IL

TUCSEN. AZ U OF ARIZONA OI - C+Y+ FAN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED A CHARGED PARTICLE TELESCOPE COMPOSED OF FOUR SILICON SOLID-STATE DETECTORS TO STUDY THE ANISOTROPY AND FLUCTUATIONS OF SOLAR PROTONS AND ALPHA PARTICLES. THE PROTON ENERGY RANGES SAMPLED WERE 0.6 TO 12.7 MEV. 12.7 TO 73.0 MEV. 73.0 TO 165 MEV. AND E.GT. 165 MEV (CORRESPONDING TO DETECTOR COINCIDENCES D102NOTD4, D102NOTD3NOTD4, DID2D3NOTD4. AN NOTCID2D3NOTD4). THE ALPHA PARTICLE ENERGY RANGES SAMPLED WERE 2.5 TO 52 MEV, 52 TO 280 MEV, AND E.GT. 280 MEV (CORRESPONDING TO THE FIRST THREE DETECTOR COINCIDENCES). THE TIME RESOLUTION RANGED FROM ABOUT ONE MEASUREMENT PER 0.4 SEC TO ABOUT ONE MEASUREMENT PER 28 SEC DEPENDING ON THE TELEMETRY BIT RATE. THE DETECTOR WAS MOUNTED TO MAKE A 360-DEG SCAN IN THE ECLIPTIC PLANE ABOUT ONCE PER SECOND. THE D3 DETECTOR FAILED ON MAY 26.

ON 08/17/66. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/26/69. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- PIONEER & ALTERNATE NAMES - PIONEER-C. 03066 NSSDC ID 67-123A

LAUNCH DATE- 12/13/67 SPACECRAFT WEIGHT IN ORBIT- 63.43 KG

LAUNCH SITE- CAPE KENNEDY . UNITED STATES

LAUNCH VEHICLE- DELTA

FUND ING AGENCY

UNITED STATES

NASA-OSSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 12/13/67 ORBIT TYPE- HELIOCENTRIC CRBIT PERICO- 386 .6 DAYS APDAPSIS- 1.0880 AU RAD PERIAPSIS- .9892 AU RAD INCLINATION- .0578 DEG

RECENT ORBIT PARAMETERS

ORBIT PERIOD- 386.6 DAYS EPOCH DATE- 12/13/67 ORBIT TYPE- HEL IOCENTRIC APDAPSIS- 1.0880 AU RAD PERIAPSIS- .9892 AU RAD INCLINATION- .0578 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FRGJECT SCIENTIST)

NASA-ARC PM - Caf. HALL

MOFFETT FIELD. CA

PS - J.H. WOLFE NASA-ARC

MOFFETT FIELD . CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 8 WAS THE THIRD IN A SERIES OF SOLAR-CREITING. SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES CESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SCLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD. COSMIC DUST. AND ELECTRIC FIELDS. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM: AND THE SPIN AXIS WAS PERPENDICULAR TO THE

ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND. ONE OF FIVE BIT RATES. ONE OF FOUR DATA FORMATS. AND ONE OF FOUR DPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512. 256. 64. 16. AND 8 BPS. THREE OF THE FOUR DATA FORMATS WERE USED PRIMARILY FOR SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES. ANOTHER WAS USED AT THE THREE LOWEST BIT RATES. THE THIRD WAS USED FOR DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT WAS USED MAINLY FOR ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME. (2) TELEMETRY STORE, (3) DUTY CYCLE STORE. AND (4) MEMORY READOUT. IN THE REAL-TIME MODE. DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR. AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM DECEMBER 13. 1967 TO MARCH 20. 1968. 256 BPS FROM MARCH 20. 1968 TO MAY 6, 1968, 64 BPS FROM MAY 6, 1968 TO AUGUST 25, 1968, 16 BPS FROM AUGUST 29, 1968 TO JANUARY 1, 1970, AND 8 BPS FROM JANUARY 1, 1970 AND THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-M ANTENNA. BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. DATA COVERAGE AVERAGED CLOSE TO 100 PERCENT FOR THE FIRST YEAR AFTER LAUNCH. AFTER THAT, THE DATA COVERAGE AVERAGED BETWEEN 50 AND 80 PERCENT UNTIL NOVEMBER 1970. COVERAGE THEN DROPPED TO BETWEEN 50 AND 0 PERCENT. PIONEER 8 LEFT THE VICINITY OF THE EARTH PASSING THROUGH THE LUNAR DISTANCE AT A LOCAL TIME OF ABOUT 3 A.M. DURING A REDRIENTATION MANEUVER IN MARCH 1968, ONE OF THE FOUR SUN SENSORS (WHICH WAS CONNECTED TO THE ATTITUDE GAS SYSTEM USED TO KEEP THE SPIN AXIS POINTED) WAS FOUND TO BE INOPERATIVE. IT WAS NOTED AT THIS TIME THAT THE SPACECRAFT ATTITUDE WAS DEF 4 DEG. ANOTHER DRIENTATION WAS ATTEMPTED IN JUNE 1968, AND IT WAS FOUND THAT THREE OF THE FOUR ATTITUDE SUN SENSORS WERE INOPERATIVE. THE PLASMA WAVE AND CELESTIAL MECHANICS EXPERIMENTS WERE PUT IN AN OPERATIONAL OFF VODE IN JULY 1972 AND JULY 1970. RESPECTIVELY.

ON 01/25/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME - SINGLE-AXIS MAGNETOMETER

NSSDC ID 67-123A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)

PI - N.F. NESS

NA SA – GSFC

GREENBELT, MD

OI - S.C. CANTARANO

U OF ROME

ROME, ITALY

DI - F. MARIANI

U OF AQUILA

AGUILA. ITALY

## EXPERIMENT BRIEF DESCRIPTION

A SINGLE. BOOM-MOUNTED UNIAXIAL FLUXGATE MAGNETOMETER, WITH MODE-DEPENDENT RANGES OF PLUS OR MINUS 32 GAMMAS AND PLUS OR MINUS 96 GAMMAS AND CORRESPONDING RESOLUTIONS OF PLUS OR MINUS 0.125 GAMMA AND PLUS OR MINUS 0.375 GAMMA. DETAINED A VECTOR MAGNETIC FIELD MEASUREMENT BY MEANS OF THREE MEASUREMENTS TAKEN AT EQUAL TIME INTERVALS DURING EACH SPACECRAFT SPIN PERIOD (APPROXIMATELY 1 SECOND). AT TELEMETRY BIT RATES LESS THAN OR EQUAL TO 16 BPS. AVERAGES WERE COMPUTED ON BOARC FOR TRANSMISSION TO EARTH.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC ID 67-123A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - J.++. WOLFE NASA-ARC MOFFETT FIELD, CA

#### EXPERIMENT BRIEF DESCRIPTION

A TRUNCATED HEMISPHERICAL ELECTROSTATIC ANALYZER (120-DEG TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 30 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 150 TO 15,000 V. THERE WAS AN ELECTRON MODE OF DPERATION IN WHICH ELECTRONS WERE MEASURED IN 14 LCGARITHMICALLY EQUISPACED E/Q STEPS RANGING FROM 12 TO 1000 V. THERE WAS ALSO A ZERC E/C. OR BACKGROUND, STEP. IN OPERATION, THE ELECTRONS WERE MEASURED FIRST, THEN BACKGROUND, AND THEN THE IONS. THE THREE COLLECTORS MEASURED PARTICLES INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). TWO COLLECTORS MEASURED FLUX FROM 10 TO 85 DEG ON EITHER SIDE OF THE SPACECRAFT EQUATORIAL PLANE, AND THE THIRD MEASURED FLUX IN A 20-DEG INTERVAL CENTERED ON THE SPACECRAFT EQUATORIAL PLANE. AS THE SPACECRAFT WAS SPINNING. FLUXES WERE MEASURED IN 23 POSSIBLE 2-13/16-DEG-WIDE AZIMUTHAL ANGULAR SECTORS. SEVENTEEN OF THESE SECTORS WERE CONTIGUOUS AND BRACKETED THE SOLAR DIRECTION (AS DETERMINED BY REFERENCING THE NORMAL TO THE INSTRUMENT APERTURE TO THE SPACE SUN SENSOR PULSE). THE REMAINING SIX SECTORS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION - POLAR SCAN, AZINUTHAL SCAN, AND MAXIMUM FLUX. AT THE TWO HIGHEST BIT RATES (512 AND 256 BPS) THE POLAR SCAN MODE WAS ALTERNATED WITH THE AZIMUTHAL SCAN MODE AT EACH E/Q STEP. IN THE POLAR SCAN MODE. ALL THREE COLLECTORS WERE OBSERVED. AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED FOR EACH COLLECTOR. IN THE AZIMUTHAL SCAN MODE: THE PEAK FLUX OBSERVED IN THE 23 AZIMUTHAL SECTORS WAS RECORDED FOR THE CENTRAL COLLECTOR AT EACH E/Q STEP. AT THE LOW BIT RATES (64, 16, AND 8 BPS), THE MAXIMUM FLUX MODE WAS USED AT EACH E/Q STEP FOLLOWED BY EITHER (1) FOR IONS. A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/Q STEP WHERE THE PEAK FLUX MEASUREMENT DURING THE MAXIMUM FLUX MODE WAS OBTAINED. OR (2) FOR ELECTRONS. A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/Q = 100 V. IN THE MAXIMUM FLUX MODE. ONLY THE CENTRAL COLLECTOR WAS OBSERVED. AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE CBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION MEASUREMENTS (AT EACH E/Q STEPS) AND ONE SET OF ELECTRON MEASUREMENTS (AT EACH E/Q STEPS). AT THE HIGH BIT RATES (512 AND 256 BPS) ONE SET OF ICH MEASUREMENTS TOOK 62 SEC AND ONE SET OF ELECTRON MEASUREMENTS 38 SEC. AT THE LOW BIT RATES (64, 16. AND 8 EPS), ONE SET OF ION MEASUREMENTS TOOK 37 SEC AND ONE SET OF ELECTRON MEASUREMENTS 28 SEC. AT 64 BPS. A COMPLETE SET OF MEASUREMENTS (SEVEN ION PLUS ONE ELECTRON) WAS TAKEN AND TELEMETERED EVERY 402.5 SEC. AT 16 BPS. IT TOOK 1610 SEC AND AT 8 PPS. IT TOOK 3220 SEC.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUESITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TWO-FREQUENCY BEACON/ RECEDIVERS

NSSDC ID 67-1234-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=CTHER-INVESTIGATOR)
PI - V.R. ESHLEMAN
OI - T.A. CROFT STANFORD U STANFORD: CA

## EXPERIMENT BRIEF DESCRIPTION

BOTH 423.3-MHZ AND ITS 2017 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABULIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY CELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPERTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT. A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO DETAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL CELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED. AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES. THE LONGSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SCLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS. SEE 68-100A-03, 56-075A-04, 65-105A-04, AND 67-060A-02, A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH. VOL. 17, P. 3325-3327, AND IN RADIO SCIENCE: VOL. 5., P. 55-63.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71. THE DATE OF THE WAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC DUST DETECTOR

NSSDC ID 67-123A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - O.E. BERG NASA-GSFC GREENBELT, ND
OI - L. SECRETAN NASA-LARC HAMPTON, VA

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO (1) MEASURE THE COSMIC DUST FLUX DENSITY IN THE SOLAR SYSTEM, (2) DETERMINE THE DISTRIBUTION OF COSMIC DUST CONCENTRATIONS IN THE EARTH'S ORBIT. (3) DETERMINE THE GRADIENT. FLUX DENSITY, AND SPEED OF PARTICLES IN METEOR STREAMS, AND (4) PERFORM AN IN-FLIGHT CONTROL EXPERIMENT ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR. THE EXPERIMENT INSTRUMENTATION. WHICH WAS MOUNTED IN THE EQUATOR OF THE SATELLITE WITH 1TS AXIS RADIAL TO THE SATELLITE SPIN AXIS FACING IN THE ECLIPTIC PLANE. CONSISTED OF A FRONT FILM-GRID SENSOR ARRAY AND A REAR FILM-GRID SENSOR ARRAY, SPACED FIVE CM APART. AND AN ACCUSTICAL IMPACT PLATE UPON WHICH THE REAR FILM WAS MOUNTED. THE SENSOR ARRAYS CONSISTED OF FOUR VERTICAL FILM STRIPS CROSSED BY FOUR HORIZONTAL GRID STRIPS TO FORM 16 FRONT AND 16 REAR FILM-GRID ARRAYS (EACH 2.5 CM SQ).

CREATING 256 POSSIBLE COMBINATIONS. EACH GRID STRIP AND FILM STRIP WAS CONNECTED TO A SEPARATE OUTPUT AMPLIFIER WHOSE SIGNALS WERE USED TO DETERMINE THE SEGMENT IN WHICH AN IMPACT OCCURRED. THE FRONT FILM SENSOR. WHICH WAS RECESSED THREE CM INTO THE EXPERIMENT HOUSING. CONSISTED OF AN 8-LAYER COMPOSITE -- 700-A PARYLENE ENCAPSULATION . 500-A CCPPER. 300-A ALUMINUM, 3000-A PARYLENE SUBSTRATE, 300-A ALUMINUM, 500-A COPPER, SUPPORT MESH. AND 500-A PARYLENE ENCAPSULATION. EACH OF THE REAR SENSOR-ARRAY FILM STRIPS CONSISTED OF A 60-MICRON MOLYBDENUM SHEET CEMENTED TO A QUARTZ ACQUSTICAL SENSOR PLATE. THE OPERATION OF THE SENSORS WAS BASED ON TWO BASIC MEASURABLE PHENOMENA THAT DCCUR WHEN A HYPERVELOCITY PARTICLE IMPACTS ON A SURFACE -- (1) FORMATION OF PLASMA AND (2) TRANSFER OF MOMENTUM. WHEN THE FRONT FILM WAS PENETRATED BY A PARTICLE, A TIME-OF-FLIGHT 4-MHZ ELECTRONIC CLOCK WAS ACTIVATED. THE CLOCK WAS SHUT OFF WHEN THE PARTICLE IMPACTED ON THE REAR FILM THUS MEASURING PARTICLE SPEED AND DIRECTION. THREE GENERAL COSMIC DUST PARTICLE TYPES WERE DETECTABLE -- (1) HIGH-ENERGY. HYPERVELOCITY PARTICLES (GREATER THAN 1 ERG), WHICH PRODUCED RESPONSES AT BOTH FRONT AND REAR FILM SENSORS. (2) LOW-BNERGY. HYPERVELOCITY PARTICLES (LESS THAN 1 ERG). WHICH PRODUCED RESPONSES ONLY AT THE FRONT FILM SENSOR. AND (3) RELATIVELY LARGE HIGH-VELOCITY PARTICLES (GREATER THAN 0.1 NANDGRAMS) WHICH COULD PASS THROUGH THE FRONT AND REAR FILM SENSOR ARRAYS WITHOUT GENERATING A DETECTABLE PLASMA BUT COULD STILL IMPART A MEASURABLE IMPULSE TO THE ACQUSTICAL SENSOR. THE ACQUSTICAL SENSORS WERE DESIGNED TO PERFORM AN IN-FLIGHT STUDY ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR IN ADDITION TO PERFORMING AS AN IMPACT SENSOR FOR THIS EXPERIMENT. IN-FLIGHT CALIBRATION WAS PROVIDED AND INITIATED BY GROUND CEMMAND AND MONITORED THE EXPERIMENT ELECTRONICS IN ADDITION TO PROVIDING A CHECK ON THE PHYSICAL CONDITION OF THE PLASMA SENSORS. THE SENSORS WERE CALIBRATED PRICE TO THE FLIGHT BY IMPACTS WITH IRON SPHERES RANGING IN MASS FROM 1 NANDGRAM TO 0.1 PICOGRAM. ACCELERATED BY A 2-MV ELECTROSTATIC ACCELERATOR TO 2 TO 10 KM/SEC. THE MASSES, DENSITIES, AND SPEEDS, HOWEVER, WERE TOO NARROW IN RANGE TO PROVIDE ANY COMPREHENSIVE CALIBRATION WHEN USING REAL DATA.

ON 01/25/71. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSSDC 1D 67-123A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR) U OF ADELATDE ADELAIDE. AUSTRALIA MCCRACKEN PI - K.G. DALLAS, TEXAS U OF TEXAS 01 - U.R. RAD DALLAS. TX U OF TEXAS BARTLEY 01 - W.C.

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A CSI SCINTILLATOR AND THREE SGLID-STATE TELESCOPES. THE CSI SCINTILLATOR WAS COLLIMATED BY AN ANTICOINCICENCE PLASTIC SCINTILLATOR AND HAD A CONICAL AFERTURE WITH A 38.2-DEG HALF-ANGLE. THE SCINTILLATOR LOOK DIRECTION WAS CENTERED IN THE ECLIPTIC PLANE. THREE SOLID-STATE DETECTORS WERE ORIENTED IN A FAN ARRANGEMENT WITH RESPECT TO A FOURTH SULID-STATE CETECTOR. SUCH THAT EACH OF THE FIRST THREE CETECTORS FORMED A TELESCOPE WITH THE FOURTH DETECTOR. EACH OF THE THREE TELESCOPES THUS FORMED HAD AN ACCEPTANCE CONE DF 23-DEG HALF-ANGLE. THE MEAN VIEWING DIRECTIONS OF THE TELESCOPES WERE IN THE ECLIPTIC PLANE AND 48 DEG ABOVE AND BELOW THAT PLANE, RESPECTIVELY. TWO CONCURRENT MODES OF COUNTING WERE EMPLOYED. IN THE FIRST MODE. COUNTS WERE ACCUMULATED IN EIGHT SEPARATE

45-DEG INTERVALS DURING THE SPACECRAFT SPIN. WHILE. IN THE SECOND.
SPIN-INTEGRATED COUNTS WERE ACQUIRED. IN THE FIRST MODE, THE SCINTILLATOR
SEPARATELY MEASURED PARTICLES WITH ENERGIES IN THE RANGES 7.4 TO 21.5
MEY/NUCLEON AND 19.7 TO 63.0 MEY/NUCLEON (NO SPECIES DISCRIMINATION) WHILE
EACH SOLID-STATE TELESCOPE SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES
3.3 TO 3.6 MEY AND 3.6 TO 6.7 MEY. IN THE SECOND MODE. THE SCINTILLATOR
SEPARATELY MEASURED PARTICLES IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 4.5
AND 40 MEY/NUCLEON (INTERVAL LOWER LIMITS AT 4.5, 7.0, 9.6, 13, 21, AND 28
MEY/NUCLEON). WHILE EACH OF THE SOLID-STATE TELESCOFES SEPARATELY MEASURED
PROTONS IN THE ENERGY RANGES 1 TO 8. 1 TO 5. 1 TO 3. AND 4 TO 6 MEY AND.
ALPHA PARTICLES IN THE ENERGY RANGE 4 TO 8 MEY. DURING EACH 244-81T MAIN
TELEMETRY FRAME. TWO FIRST-MODE 9-BIT ACCUMULATORS AND ONE SECONO-MODE 9-BIT
ACCUMULATOR WERE READ OUT. INFLIGHT CALIBRATION OF THE SCINTILLATOR AND OF
SOME OF THE ELECTRONICS WAS PERFORMED DAILY. SEE BUKATA ET AL. IEEE TRANS.
NUC. SCI.. NS-17. 18-24. 1970. FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY GRADIENT DETECTOR

NSSDC ID 67-123A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - W.R. WEBBER U OF NEW HAMPSHIRE DURHAM, NH

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A CERENKOV DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES. PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.34 AND 8.4 MEV. PROTONS IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 3.49 AND 64.3 MEV (ONE OF FIVE COUNT RATES WAS DUE TO THE SUM OF COUNTS IN TWO NONCONTIGUOUS ENERGY INTERVALS). AND ALPHA PARTICLES IN FOUR CONTIGUOUS ENERGY INTERVALS BETWEEN 6.64 AND 64.1 MEV/NUCLEGN (CHE OF THREE COUNT RATES. WAS DUE TO THE SUM OF COUNTS IN TWO NONCONTIGUOUS ENERGY INTERVALS). A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV/NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV/NUCLEON AND ELECTRONS ABOVE 5.1 MEV. SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND WERE TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN PERIOD. THE EXPERIMENT FUNCTIONED WELL FROM LAUNCH THROUGH JANUARY 1973. ALTHOUGH. AT THE PRESENT LOW TELEMETRY BIT RATES. ACCUMULATOR SATURATION HAS RENDERED SOME COUNTING MCDES TO BE OF NO VALUE. FOR FURTHER DETAILS, SEE J. GEOPHYS. RES., VOL. 76, PAGE 1605. 1971.

ON 01/25/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- EXPLORER 37 SOLRAD 9. 03141 ALTERNATE NAMES-

NSSDC ID 68-017A

LAUNCH DATE- 03/05/68

SPACECRAFT WEIGHT IN ORBIT-

433. KG

LAUNCH SITE- WALLOPS ISLAND. UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY UNITED STATES

NASA-OSSA

INITIAL DRBIT PARAMETERS

EPOCH DATE- 03/06/68 ORBIT TYPE- GEOCENTRIC ORBIT PERICO- 98.68 MIN PERIAPSIS- 513.000 KM ALT INCLINATION- 59.43 DEG APOAPS IS- 881.000 KM ALT

RECENT ORBIT PARAMETERS

ORBIT PERIOD- 98.025 MIN EPOCH DATE- 01/25/73 ORBIT TYPE- GEOCENTRIC PERIAPSIS- 501. KM ALT INCLINATION- 59.4082 DEG KM ALT APDAPSIS-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. FS=PROJECT SCIENTIST) NAVAL RESEARCH LAB WASHINGTON. DC KREPLIN

# SPACECRAFT BRIEF DESCRIPTION

THE NRL SOLRAD 9 SATELLITE WAS ONE OF A SERIES OF SATELLITES THAT BEGAN IN 1960 TC PROVIDE CONTINUOUS COVERAGE OF SCLAR RADIATION WITH A SET OF STANDARD PHOTOMETERS. SOLRAD 9 WAS A SPIN-STABILIZED SATELLITE CRIENTED WITH ITS SPIN AXIS PERPENDICULAR TO THE SUN-SATELLITE LINE SO THAT THE 14 SOLAR X-RAY AND UV PHOTOMETERS POINTING RADIALLY CUTWARD FROM ITS EQUATORIAL BELT VIEWED THE SUN WITH EACH REVOLUTION. DATA WERE SIMULTANEOUSLY TRANSMITTED VIA FM/AM TELEMETRY AND RECORDED IN A CORE MEMORY THAT READ OUT ITS CONTENTS ON COMMAND. INDIVIOUAL SCIENTISTS AND INSTITUTIONS ARE INVITED TO RECEIVE AND USE THE DATA TRANSMITTED ON THE 136-MHZ TELEMETRY BAND ON THE STANDARD IRIG CHANNELS 3 THROUGH 8.

ON 03/05/68, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR RADIATION DETECTORS

NSSDC 1D 68-017A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) NAVAL RESEARCH LAB WASHINGTON. DC KREPLIN PI - R.W.

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF 14 DETECTORS COVERING THE RANGES 20 TO 80 KEY, 0.5 TO 60 A. AND 1080 TO 1350 A. THE DETECTORS WERE DESIGNED TO MEASURE WAVELENGTH AND FLUX SHIFTS OF SOLAR RADIATION DURING PERIODS OF LOW AND HIGH SQLAR ACTIVITY. THE DETECTORS WERE STANDARDIZED PHOTOMETERS SIMILAR TO THOSE FLOWN ON SOLRAC 8. DATA FROM THREE PAIRS OF THESE DETECTORS COVERING THE RANGE 0.5 TO 16 A WERE STORED IN THE ONEDARD NEWCRY TO PROVIDE FULL TIME COVERAGE. WHILE THE OTHER DATA WERE TRANSMITTED IN REAL TIME ONLY. (REAL-TIME DATA WERE RECORDED FOR AT LEAST 10 MIN PER CREIT.) THE UV AND 20-TO 80-KEY DETECTORS FAILED SHORTLY AFTER LAUNCH.

ON 03/05/68. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/30/68, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- PIONEER S

NSSDC 10 68-100A

ALTERNATE NAMES-

PIONEER-D, PL-684K, 03533

63.4 KG

LAUNCH DATE- 11/08/68

SPACECRAFT WEIGHT IN GRBIT-

LAUNCH VEHICLE- DELTA

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

FUNDING AGENCY UNITED STATES

NASA~DSSA

INITIAL DRBIT PARAMETERS

EPOCH DATE- 11/08/68 ORBIT TYPE- HELIOCENTRIC CRBIT PERIOD- 297.6 DAYS -9905 AU RAD PERIAPSIS- .7542 AU RAD INCLINATION→ .086509 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 11/08/68 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 297.6 DAYS APO APS IS-•9905 AU RAD PERIAPSIS- .7542 AU RAD INCLINATION- .086509 DEG

SPACECRAFT PERSONNEL (PM=PRGJECT MANAGER. PS=PRGJECT SCIENTIST)

PM - C.F. HALL PS - J.H.

NASA-ARC

MOFFETT FIELD, CA

WOLFE NASA-ARC MOFFETT FIELD, CA

#### SPACECRAFT BRIEF DESCRIPTION

PIONEER 9 WAS THE FOURTH IN A SERIES OF SOLAR-CREITING. SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO DBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SGLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS. THE INTERPLANETARY MAGNETIC FIELD. COSMIC DUST. AND ELECTRIC FIELDS. ALSO. A NEW CODING PROCESS WAS IMPLEMENTED FOR PICNEER 9. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM. AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND. CHE CF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512. 256. 64. 16. AND 8 BFS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES, ANOTHER WAS USED AT THE THREE LCKEST BIT RATES, AND THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT. IN THE REAL-TIME MODE. DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MOCE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE. A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE

TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS OF UP TO 19 HR. AS LIMITED BY THE EIT STERAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM NOVEMBER 8, 1968 TO JANUARY 15, 1969, 256 BPS FROM JANUARY 16, 1969 TO JANUARY 25, 1969, 64 BPS FROM JANUARY 30, 1969 TO MARCH 27. 1969, 16 BPS FROM MARCH 28, 1969 TO MAY 3, 1969, AND 8 BPS FROM MAY 3. 1969 AND THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-CM ANTENNA. BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. THE CATA COVERAGE AVERAGED CLOSE TO 100 PRCENT FOR THE FIRST 29 WEEKS AFTER LAUNCH. AFTER THIS, DATA COVERAGE DROPPED TO CLOSE TO 50 PERCENT UNTIL DECEMBER AND IT AVERAGED LESS THAN 30 PERCENT THROUGH JULY 1971. PIONEER 9 LEFT THE VICINITY OF THE EARTH PASSING THROUGH THE BOW SHOCK AT A LOCAL TIME OF 7 P.M. THE NEW CODING PROCESS INCREASED THE COMMUNICATIONS RANGE OF THE SATELLITE AT EACH BIT RATE. THE CELESTIAL MECHANICS EXPERIMENT WAS PUT INTO AN OPERATIONALLY OFF MODE IN FEBRUARY 1971.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- THREE-AX IS MAGNETOMETER

NSSDC IC 68-100A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - C.P. SONETT NASA-ARC MCFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

A BOOM-MOUNTED, TRIAXIAL FLUXGATE MAGNETOMETER WAS USED TO STUDY THE INTERPLANETARY MAGNETIC FIELD AND ITS FLUCTUATIONS. THE SENSORS WERE DRIHOGONALLY MOUNTED WITH ONE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS. UPON COMMAND, A MOTOR INTERCHANGED A SENSOR IN THE SPIN PLANE WITH THE SENSOR ALONG THE SPIN AXIS. ENABLING INFLIGHT DETERMINATION OF ZERO LEVELS. EVERY 24 HR. THE INSTRUMENT WAS COMMANDED INTO A SELF-CALIBRATE SEQUENCE. AND THIS WAS OFTEN REPEATED AFTER THE SENSORS WERE FLIPPED. THE INSTRUMENT. WHICH HAD A DYNAMIC RANGE OF PLUS OR MINUS 200 GAMMAS WITH A RESOLUTION OF PLUS OR MINUS 0.2 GAMMA, WAS CAPABLE OF INFLIGHT DEMODULATION OF THE SIGNALS RECEIVED FROM THE TWO SENSORS IN THE SPIN PLANE. EACH MAGNETIC FIELD COMPONENTS. COMPRISING THREE MAGNETIC FIELD VECTORS, WERE TRANSMITTED IN EACH SPACECRAFT TELEMETRY FRAME.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

CN 05/19/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC IC 68-100A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) GI=CTHER INVESTIGATOR)
PI - J.H. WOLFE NASA-ARC MCFFETT FIELD. CA

# EXPERIMENT BRIEF DESCRIPTION

A TRUNCATED HEMISPHERICAL ELECTROSTATIC ANALYZER (120-DEG TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 30 LOGARITHMICALLY ECUISPACED ENERGY PER UNIT CHARGE (E/G) STEPS FROM 150 TO 15.000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN 14 LOGARITHMICALLY EQUISPACED E/Q STEPS RANGING FROM 12 TO 1000 V. THERE WAS ALSO A ZERO E/G. OR BACKGROUND, STEP. IN OPERATION, THE ELECTRONS WERE WEASURED FIRST, THEN BACKGROUND, AND THEN THE IONS. THE THREE COLLECTORS MEASURED PARTICLES INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). TWO COLLECTORS MEASURED FLUX FROM 10 TO 85 DEG ON EITHER SIDE OF THE SFACECRAFT EQUATORIAL PLANE, AND THE THIRD MEASURED FLUX IN A 20-DEG INTERVAL CENTERED ON THE SPACECRAFT EQUATORIAL PLANE. AS THE SPACECRAFT WAS SPINNING. FLUXES WERE MEASURED IN 23 POSSIBLE 2-13/16-DEG-WIDE AZIMUTHAL ANGULAR SECTORS. SEVENTEEN OF THESE SECTORS WERE CONTIGUOUS AND BRACKETED THE SOLAR DIRECTION (AS DETERMINED BY REFERENCING THE NORMAL TO THE INSTRUMENT APERTURE TO THE SPACE SUN SENSOR PULSE). THE REMAINING SIX SECTORS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION - FOLAR SCAN. AZIMUTHAL SCAN. AND MAXIMUM FLUX. AT THE TWO HIGHEST BIT RATES (512 AND 256 BPS) THE POLAR SCAN MODE WAS ALTERNATED WITH THE AZIMUTHAL SCAN MODE AT EACH E/Q STEP. IN THE POLAR SCAN MODE. ALL THREE COLLECTORS WERE OBSERVED. AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPURTED FOR EACH COLLECTOR. IN THE AZIMUTHAL SCAN MODE. THE PEAK FLUX OBSERVED IN THE 23 AZIMUTHAL SECTORS WAS RECORDED FOR THE CENTRAL COLLECTOR AT EACH E/Q STEP. AT THE LOW BIT RATES (64. 16. AND 8 BPS). THE MAXIMUM FLUX MODE WAS USED AT EACH EZQ STEP FOLLOWED BY EITHER (1) FOR IONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/Q STEP WHERE THE PEAK FLUX MEASUREMENT DURING THE MAXIMUM FLUX MODE WAS OBTAINED. OR (2) FOR ELECTRONS. A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/Q = 100 V. IN THE MAXIMUM FLUX MCDE. ONLY THE CENTRAL COLLECTOR WAS OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION MEASUREMENTS (AT EACH E/Q STEPS) AND ONE SET OF ELECTRON MEASUREMENTS (AT EACH E/Q STEPS). AT THE HIGH BIT RATES (512 AND 256 BPS) ONE SET OF ION MEASUREMENTS TOOK 62 SEC AND ONE SET OF ELECTRON MEASUREMENTS 38 SEC. AT THE LOW BIT RATES (64. 16. AND 8 EPS), ONE SET OF ION MEASUREMENTS TOOK 37 SEC AND ONE SET OF ELECTRON MEASUREMENTS 28 SEC. AT 64 BPS. A COMPLETE SET OF MEASUREMENTS (SEVEN ION PLUS ONE ELECTRON) WAS TAKEN AND TELEMETERED EVERY 402.5 SEC. AT 16 BPS. IT TOOK 1610 SEC, AND, AT 8 8PS. IT TOOK 3220 SEC.

ON 05/19/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TWO-FREQUENCY BEACCH RECEIVER

NSSDC ID 68-100A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - V.R. ESHLEMAN STANFORD L STANFORD, CA
DI - T.A. CROFT STANFORD U STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY

TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROFAGATION TIME WAS NOT APPRECIABLY CELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT. A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES.

DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED. AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES. THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE CBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SCLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS FOR OTHER TIME PERIODS SEE 67-123A-03, 66-075A-04, 65-105A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL UP GEOPHYSICAL RESEARCH. VOL. 17. PP. 3325-3327. AND IN RADIO SCIENCE, VOL. 6., PP. 55-63.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC DUST DETECTOR

NESDC ID 68-100A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - 0.E. BERG NASA-GSFC GREENBELT, ND

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO (1) MEASURE THE CONIC DUST FLUX DENSITY IN THE SOLAR SYSTEM, (2) DETERMINE THE DISTRIBUTION OF COSMIC DUST CONCENTRATIONS IN THE EARTH'S ORBIT. (3) DETERMINE THE GRADIENT, FLUX DENSITY, AND SPEED OF PARTICLES IN METEOR STREAMS, AND (4) PERFORM AN IN-FLIGHT CONTROL EXPERIMENT ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR. THE EXPERIMENT INSTRUMENTATION WAS IDENTICAL TO THAT CARRIED ON PIONEER 8, CONSISTING ESSENTIALLY OF TWO THIN FILM-GRID DETECTORS (SEPARATED BY A CISTANCE OF 5 CM) THAT PRODUCED AN ELECTRICAL SIGNAL WHEN THE FILM WAS PENETRATED BY A MICROMETECTIO. EACH FILM HAD A SENSITIVE AREA OF 100 SQ CM AND WAS COMPOSED OF 16 SECMENTS THAT PROVIDED BOTH THE DIRECTION AND THE TIME-OF-FLIGHT NEEDED FOR THE METEOROID TO TRAVERSE THE S-CM DISTANCE ESTWEEN THE FRONT FILM AND REAR FILM SENSOR. THE COMBINED RESULTS OF THE FIONEER 8 AND 9 COSMIC DUST EXPERIMENTS LENT STRONG SUPPORT TO THE HYPOTHES IS THAT THE BULK OF METEOROID DUST IS OF COMETARY ORIGIN.

ON 05/19/69. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS (FANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSSDC ID 68-100A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - K.G. MCCRACKEN U OF ADELAIDE ACELAIDE, AUSTRALIA

OI - U.R. RAO GI - W.C. BARTLEY U OF TEXAS

DALLAS, TEXAS Dallas, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A CSI SCINTILLATOR AND THREE SOLID-STATE TELESCOPES. THE CSI SCINTILLATOR WAS COLLIMATED BY AN ANTICOINCIDENCE PLASTIC SCINTILLATOR AND HAD A CONICAL AFERTURE WITH A 38.2-DEG HALF-ANGLE. THE SCINTILLATOR LOOK DIRECTION WAS CENTERED IN THE ECLIPTIC PLANE. THREE SOLID-STATE DETECTORS WERE ORIENTED IN A FAN ARRANGEMENT WITH RESPECT TO A FOURTH SULID-STATE DETECTOR SUCH THAT EACH OF THE FIRST THREE DETECTORS FORMED A TELESCOPE WITH THE FOURTH DETECTOR. EACH OF THE THREE TELESCOPES THUS FORMED HAD AN ACCEPTANCE CONE OF 23-DEG HALF-ANGLE. THE MEAN VIEWING DIRECTIONS OF THE TELESCOPES WERE IN THE ECLIPTIC PLANE AND 48 DEG ABOVE AND BELOW THAT PLANE, RESPECTIVELY. TWO CONCURRENT MCDES OF COUNTING WERE EMPLOYED. IN THE FIRST MODE, COUNTS WERE ACCUMULATED IN EIGHT SEPARATE 45-DEG INTERVALS DURING THE SPACECRAFT SPIN. WHILE. IN THE SECOND. SPIN-INTEGRATED COUNTS WERE ACQUIRED. IN THE FIRST MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES WITH ENERGIES IN THE RANGES 7.4 TO 21.5 MEV/NUCLEON AND 19.7 TO 63.0 MEV/NUCLECK (NO SPECIES DISCRIMINATION) WHILE EACH SOLID-STATE TELESCOPE SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 3.3 TO 3.6 MEV AND 3.6 TO 6.7 MEV. IN THE SECOND MCDE. THE SCINTILLATOR SEPARATELY MEASURED PARTICLES IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 4.5 AND 40 MEV/NUCLEON (INTERVAL LOWER LIMITS AT 4.5, 7.0. 9.6, 13, 21, AND 28 MEV/NUCLEUN), WHILE EACH OF THE SOLID-STATE TELESCOPES SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 1 TO E. 1 TO 5. 1 TC 3. AND 4 TO 6 MEY AND ALPHA PARTICLES IN THE ENERGY RANGE 4 TO 8 MEV. DURING EACH 224-81T MAIN TELEMETRY FRAME, TWO FIRST-MODE 9-BIT ACCUMULATORS AND ONE SECOND-MODE 9-BIT ACCUMULATOR WERE READ OUT. INFLIGHT CALIBRATION OF THE SCINTILLATOR AND OF SOME OF THE ELECTRONICS WAS PERFORMED DAILY. SEE BUKATA ET AL. IEEE TRANS. NUC. SCI., NS-17, PP. 18-24, 1970, FOR A MORE DETAILED EXFERIMENT DESCRIPTION.

UN 05/19/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY TELESCOPE

NESDC ID 68-100A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=OTHER INVESTIGATOR)
PI - W.R. WEBBER U OF NEW HAMPSHIRE DURHAN. NH

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A CERENKOV DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENCICULAR TO THE SPACECRAFT SPIN AXIS. AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES. PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.31 AND 5.1 MEV. PROTONS IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 2.2 AND 42 MEV. AND ALPHA PARTICLES IN THOSE CONTIGUOUS ENERGY INTERVALS BETWEEN 5.8 AND 42 MEV.NUCLEON. A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV.NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV.NUCLEON AND ELECTRONS ABOVE 5.1 MEV. SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND MERE

TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN FERIOD. AT THE PRESENT LOW TELEMETRY BIT RATES, THE DATA IS RATHER SPARSE.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

CN 05/19/69. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NURMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- PLASMA WAVE DETECTOR

NSSDC ID 68-100A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) REDONDO BEACH. CA TRW SYSTEMS GROUP 5 CAP F PI - F.L. TRW SYSTEMS GROUP REDONDO BEACH, CA OI - 1.M. GREEN TRW SYSTEMS GROUP RECONCO BEACH, CA 01 - G.M. CROCK REDONDO EEACH. CA TRW SYSTEMS GROUP FREDERICKS 01 - R.W.

## EXPERIMENT BRIEF DESCRIPTION

ELECTROSTATIC AND ELECTROMAGNETIC PLASMA WAVES WERE MEASURED IN THE SOLAR WIND NEAR 1 AU USING AN UNBALANCED ELECTRIC DIPOLE ANTENNA. THE 423-MHZ STANFORD UNIVERSITY ANTENNA, WHICH SERVED AS THE SENSOR. WAS CAPACITIVELY COUPLED TO THREE TELEMETRY CHANNELS. CHANNEL 1 WAS A 15-PERCENT BANDPASS FILTER CENTERED AT 400 HZ. CHANNEL 2 WAS A 15-PERCENT EANDPASS FILTER CENTERED AT 30 KHZ. THESE CHANNELS WERE EACH SAMPLED 64 TIMES PER TELEMETRY SEQUENCE. CHANNEL 3 WAS A BROADBAND 100-HZ TO 100-KHZ CHANNEL. THE BROADEAND CHANNEL WAS FED INTO A COUNT RATE METER THAT MEASURED THE NUMBER OF POSITIVE COINCIPULSES PER UNIT TIME HAVING AMPLITUDES LARGE ENCUGH TO CROSS THE PRESENT TRIGGER LEVEL. THE TRIGGER LEVEL WAS VARIED THROUGH EIGHT STEPS EIGHT TIMES PER TELEMETRY SEQUENCE. THE TRIGGER LEVELS, TOGETHER WITH THE COUNT RATE AT EACH LEVEL. GAVE A MEASURE OF THE BREADBAND POWER SPECTRUM. THE TELEMETRY SEQUENCE WAS REPEATED OVER TIME INTERVALS FROM 7 MIN 28 SEC TO 472 MIN 52 SEC. WITH MOST OF THE DATA DETAINED AT 59 MIN 44 SEC PER TELEMETRY SECUENCE DURING THE FIRST YEAR OF ACQLISITION. THIS IMPLIES THAT ONE 8-STEP PULSE HEIGHT ANALYSIS AND EIGHT 400-HZ AND 30-KHZ MEASUREMENTS WERE MADE EVERY 7 MIN 28 SEC.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- ESSA 8
ALTERNATE NAMES- PL-691A. TOS-F. 03615

NSSDC ID 68-114A

LAUNCH DATE- 12/15/68

SPACECRAFT WEIGHT IN ORBIT-

132. KG

LAUNCH SITE- VANCENEERG AFE, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES

ESSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 12/16/68 ORBIT TYPE- GEOCENTRIC CRBIT PERICO- 114.7 MIN APOAPSIS- 1473.00 KM ALT PERIAPSIS- 1410.00 KM ALT INCLINATION- 101.90 DEG

RECENT DRBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEDCENTRIC ORBIT PERIOD- 114.60 MIN APOAPSIS- 1462.50 KM ALT PERIAPSIS- 1411.88 KM ALT INCLINATION- 101.642 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FRCJECT SCIENTIST)
PM - W.W. JONES NASA-GSFC GREENBELT, MD

### SPACECRAFT ERIEF DESCRIPTION

ESSA 8 WAS A SUN-SYNCHRONOUS OPERATIONAL METECROLOGICAL SATELLITE DESIGNED TO PROVIDE REAL-TIME EARTH CLOUDCOVER TV PICTURES TO PROPERLY EQUIP GROUND RECEIVING STATIONS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE SATELLITE HAD ESSENTIALLY THE SAME CONFIGURATION AS THAT OF A TIRCS SPACECRAFT. I.E.. AN 18-SIDED RIGHT PRISM, 107 CM ACROSS OPPOSITE CORNERS AND 56 CM HIGH, WITH A REINFORCED BASEPLATE CARRYING MEST OF THE SUBSYSTEMS AND A COVER ASSEMBLY (HAT). ELECTRICAL POWER WAS PROVIDED BY APPROXIMATELY 10,000 1- BY 2-CM SOLAR CELLS THAT WERE MOUNTED ON THE COVER ASSEMBLY AND BY 21 NICKEL-CADMIUM BATTERIES. TWO REDUNDANT WIDE-ANGLE AUTCHATIC PICTURE TRANSMISSION (APT) CAMERAS WERE MOUNTED ON OPPOSITE SIDES OF THE SPACECRAFT WITH THEIR OPTICAL AXES PERPENDICULAR TO THE SPIN AXIS. PROJECTING DOWNWARD FROM THE BASEPLATE WERE A PAIR OF CROSSED-DIPOLE COMMAND RECEPTION ANTENNAS. A MONOPOLE TELEMETRY (136.500 MHZ) AND TRACKING (136.770 MHZ) ANTENNA EXTENDED OUTWARD FROM THE TOP OF THE COVER ASSEMBLY. THE SATELLITE SPIN RATE WAS CONTROLLED BY MEANS OF A MAGNETIC ATTITUDE SPIN COIL (MASC). WITH THE SPIN AXIS MAINTAINED NORMAL TO THE ORBITAL PLANE (CARTWHEEL ORBIT MODE) TO WITHIN PLUS OR MINUS 1 CEG. THE MASC WAS A CURRENT-CARRYING COIL MOUNTED IN THE COVER ASSEMBLY. THE MAGNETIC FIELD INDUCED BY THE CURRENT INTERACTED WITH THE EARTH®S MAGNETIC FIELD TO PROVIDE THE TORQUE NECESSARY TO MAINTAIN A DESIRED SPIN RATE OF 10.9 RPM.

ON 12/15/68, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- AUTOMATIC PICTURE TRANSMISSION (APT) NSSDC ID 68-114A-01 SYSTEM

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR)
PI - NESS STAFF NDAA-NESS SUITLAND.

### EXPERIMENT BRIEF DESCRIPTION

THE ESSA 8 AUTOMATIC PICTURE TRANSMISSION (APT) SUBSYSTEM WAS A CAMERA AND TRANSMITTER COMBINATION DESIGNED TO TRANSMIT REAL-TIME. DAYLIGHT, SLOW-S CAN TELEVISION PICTURES OF CLOUDCOVER TO ANY PROPERLY EQUIPPED GROUND RECEIVING STATIONS. THE CAMERA SYSTEM CONSISTED OF TWO REDUNDANT APT CAMERAS WITH 2.54-CM-DIAM VIDICONS. EACH CAMERA HAD A 108-DEG WIDE-ANGLE F/1.8 DBJECTIVE LENS WITH A FOCAL LENGTH OF 5.7 MM. THE CAMERAS WERE MOUNTED 180 DEG APART ON THE SIDE OF THE SPACECRAFT, WITH THEIR OPTICAL AXES PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THE CAMERAS WERE PROGRAMMED TO TAKE FOUR OR EIGHT APT PICTURES PER ORBIT. THE ACTUAL PICTURE TAKING REQUIRED 8 SEC AND THE TRANSMISSION 200 SEC. EARTH-CLOUD IMAGES WERE RETAINED ON THE PHOTOSENSITIVE SURFACE OF THE VIDICON AND WERE READ OUT ATFOUR LINES PER SECOND TO PRODUCE AN 800-LINE PICTURE. TWO 5-W TV

TRANSMITTERS (137.5 MHZ) RELAYED THE PICTURES TO LCCAL APT STATIONS WITHIN COMMUNICATION RANGE. THE FACEPLATE OF THE VIDICON HAD RETICLE MARKS THAT APPEARED ON THE PICTURE FORMAT TO AID IN RELATING THE PICTURE TO ITS GEOGRAPHICAL POSITION ON THE EARTH'S SURFACE. AT NOMINAL SATELLITE ATTITUDE AND ALTITUDE (APPROXIMATELY 1450 KM), A PICTURE COVERED A 3100-BY 3100-KM SQUARE WITH A HORIZONTAL RESOLUTION OF ABOUT 4 KM AT NADIR. THERE WAS A 30 PERCENT OVERLAP EETWEEN PICTURES ALONG THE TRACK TO ENSURE COMPLETE COVERAGE. A SHIFT IN CAMERA NUMBER 2 VIDICON SCANNING CCCURRED IN THE SPRING OF 1969. AND ITS OPERATION HAS BEEN LIMITED SINCE THAT TIME. IDENTICAL EXPERIMENTS WERE FLOWN ON ESSA 2. 4. AND 6. APT DATA ARE PRIMARILY INTENDED FOR OPERATIONAL USE WITHIN THE LOCAL APT ACQUISITION STATION. HOWEVER, COPIES OF PICTURES TAKEN OVER THE UNITED STATES ARE MAINTAINED ON FILE AT NOAA-NESS. SUITLAND. MARYLAND.

ON 12/15/68. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/00/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- ISIS 1 ALTERNATE NAMES- ISIS-A. 03669 NSSDC 1D 69-009A

LAUNCH DATE- 01/30/69 SPACECRAFT WEIGHT IN ORBIT- 389. KG

LAUNCH SITE- VANCENBERG AFB. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

CANADA CRC
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS

EPOCH DATE- 01/29/69 ORBIT TYPE- GEOCENTRIC DEBIT PERIOD- 128.35 MIN
APDAPSIS- 3524. KM ALT PERIAPSIS- 581. KM ALT INCLINATION- 88.4174 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC CRBIT PERICD- 128.21 MIN APOAPSIS- 3514.80 KM ALT PERIAPSIS- 574.20 KM ALT INCLINATION- 88.429 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=PROJECT SCIENTIST)

PM - J.E. JACKSON NASA-GSFC GREENBELT. MD
PM - J.H. WHITTEKER CCMM RESEARCH CENTRE OTTAWA. ONTARIO

PS - J.H. WHITTEKER COMM RESEARCH CENTRE OTTAWA, ONTARIO, CANADA

PS - J.E. JACKSON NASA-GSFC GREENBELT. HD

### SPACECRAFT BRIEF DESCRIPTION

ISIS 1 WAS AN IGNOSPHERIC OBSERVATORY INSTRUMENTED WITH SWEEP FREQUENCY AND FIXED FREQUENCY IGNOSONDES. A VLF RECEIVER. ENERGETIC AND SOFT PARTICLE DETECTORS, AN IGN MASS SPECTROMETER. AN ELECTROSTATIC PROBE. AN ELECTROSTATIC ANALYZER. A BEACON TRANSMITTER. AND A COSMIC NOISE EXPERIMENT. THE SQUNDER USED TWO LONG DIPOLE ANTENNAS (78.9 M AND 20.2 M LONG. RESPECTIVELY). THE SATELLITE WAS SPIN STABILIZED AT ABOUT 2.9 RPM AFTER ANTENNA DEPLOYMENT. SOME CONTROL COULD BE EXERCISED OVER THE SPIN RATE AND ATTITUDE BY USING MAGNETICALLY—INDUCED TORQUES TO CHANGE THE SPIN RATE AND

TO PRECESS THE SPIN AXIS. A TAPE RECORDER WITH 1-HR CAPACITY WAS INCLUDED ON THE SATELLITE. THE SATELLITE COULD BE PROGRAMMED TO TAKE RECORDED OBSERVATIONS FOR FOUR DIFFERENT TIME PERIODS FOR EACH FULL RECORDING PERIOD. THE RECORDER WAS DUMPED ONLY AT OTTAWA. FOR NON-TAPE-RECORDED OBSERVATIONS. DATA FOR THE SATELLITE AND SUBSATELLITE REGIONS COULD BE OBSERVED AND TELEMETERED WHEN THE SPACECRAFT WAS IN THE LINE OF SIGHT OF TELEMETRY STATIONS. THE SELECTED TELEMETRY STATIONS WERE IN AREAS THAT PROVIDED PRIMARY DATA COVERAGE NEAR THE 80-DEG W MERIDIAN, PLUS AREAS NEAR HAWAII. SINGAPORE. AUSTRALIA. ENGLAND. NORWAY, INDIA. JAFAN. ANTARCTICA. NEW ZEALAND. AND CENTRAL AFRICA. NO TAPE-RECORDED DATA WERE AVAILABLE AFTER JANUARY 30, 1970. BECAUSE OF FAILURE OF THE RECORDER. THE ICA MASS SPECTROMETER FAILED ABOUT 3 DAYS AFTER LAUNCH. INITIALLY, 6 TO 9 HOURS OF OBSERVATIONS WERE MADE CAILY, BUT BY THE SPRING OF 1973. ONLY 4 TO 5 HOURS OF OBSERVATIONS PER DAY WERE BEING MADE. THE DECREASE IN OBSERVATION TIME WAS DUE TO A COMBINATION OF FUNDING AND POWER LIMITATIONS. AND SCHEDULING.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER

NSSDC ID 69-009A-01

EXPERIMENT	PERS ONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OT	HER INVESTIGATOR)
PI - J.H.		COMM RESEARCH CENTRE	CTTAWA, ENTARIO, CANADA
01 - G.E.K.	LOCKWOOD		CTTAWA, ONTARIO, CANADA
01 - G.L.	NELMS	COMM RESEARCH CENTRE	OTTAWA: ONTARIO: CANADA
01 - J.E.	JACK SCN	NASA-GSFC	GREENBELT. MD
OI - J.W.	KING	R SR S	SLOUGH. BUCKS. ENGLAND
01 - J.	TURNER	DEPARTMENT OF INTERIOR	
OI - M.	SYLVAIN	CNRS	ST MAUR. FRANCE
OI - 0.	HOLT	AURORAL OBS	TROMSO. NOR WAY
01 - Y.	DGAT A	RRL	TOKYO. JAPAN
01 - R.	RAGHAVARAD	PHYSICAL RESEARCH LAB	

#### EXPERIMENT BRIEF DESCRIPTION

THE ISIS 1 IDNOSONDE WAS A RADIO TRANSMITTER/RECEIVER THAT RECORDED THE TIME DELAY EETWEEN A TRANSMITTED AND A RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0+1 AND 20 MHZ WAS SAMPLED CACE EVERY 19 OR 29 SEC. AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO SOUNDED FOR A PERIOD OF 3 TO 5 SEC DURING THIS 19- OR 25-SEC PERIOD. IN ADDITION TO THE SWEEP AND FIXED FREQUENCY MODES OF OPERATION. A MIXED MODE WAS POSSIBLE WHERE THE TRANSMITTER FREQUENCY WAS FIXED AT 0.82 MHZ WHILE THE RECEIVER SWEPT. SEVERAL VIRTUAL FEIGHT (DELAY TIME) TRACES WERE NORMALLY COSERVED DUE TO GROUND REFLECTIONS, PLASMA RESONANCES, BIREFRINGENCE OF THE ICHOSPHERE. NON-VERTICAL PROPAGATION. ETC. VIRTUAL HEIGHT AT A GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL. ELECTRON DENSITY ALONG THE PROPAGATION PATH. AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM SHOWING VIRTUAL HEIGHT AS A FUNCTION OF FREQUENCY. TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE ICNCGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC ICACSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY PROFILES.

ON 01/30/70. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

# EXPERIMENT NAME- FIXED FREQUENCY SOUNDER

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - W.	CALVERT	NOAA	BOULCER, CO
	NORT ON	NO AA - ERL	BOULDER, CO
DI - J.M.	WARNOCK	AACH	BOULDER, CO
	NELMS	COMM RESEARCH CEN	TRE OTTAWA, CHTARIC, CANADA
01 - G.E.K.		COMM RESEARCH CEN	
DI - J.H.			
DI - C.F.	PETRIE	COMM RESEARCH CEN	TIRE CITABRY CRIRATES CARRES

### EXPERIMENT BRIEF DESCRIPTION

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA.

TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT

NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLY-BACK PERIOD OF THE

SWEEP FREQUENCY OPERATION WHICH WAS EVERY 19 OR 29 SEC. ONE OF SIX

FREQUENCIES (0.25, 0.48, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE

BY THE EXPERIMENTER AS DESIRED. OTHER MODES OF CPERATION WERE AVAILABLE.

INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY. AND A SPECIAL

MIXED MODE WITH TRANSMISSION AT THE FIXED FREQUENCY OF 0.82 MHZ AND SWEEP

RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY ICNOSPHERIC FEATURES OF A

SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER. AND TO STUDY

PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF

PROPAGATION TIME OF THE REFLECTED PULSE) AND TIME (A FUNCTION OF

GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE

SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA

WAS TAPE RECORDED DURING THE FIRST YEAR AFTER LAUNCH.

ON 01/30/70. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- VLF RECEIVER

NSSDC 10 69-009A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - R.E. BARRINGTON COMM RESEARCH CENTRE OTTAWA, CNTARIO, CANADA

#### EXPERIMENT BRIEF DESCRIPTION

THE VLF EXPERIMENT WAS A LOW-FREQUENCY. BROADEAND RECEIVER THAT SENSED SIGNALS RECEIVED BY THE 79-M DIPOLE (SPLIT MONOPOLE) ANTENNA, BETWEEN .05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING FREQUENCIES BELOW 5 MHZ ON THE IONOSONDE. THE RECEIVER HAD A WIDE DYNAMIC FANGE (80 CE) THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL SYSTEM. THIS VLF EXPERIMENT INCLUDED AN OPTIONAL-USE ONBOARD EXCITER THAT OPERATED OVER A FREQUENCY CYCLE FROM ZERO TO .3 TO ZERO TO ELEVEN TO ZERO KHZ EVER A 3.5-SEC "FRAME" PERIOD. THE TRANSMISSION AT .3 KHZ OCCURRED FOR ABOUT 2 SEC. THE NON-LINEAR SWEEP TO 11 KHZ REQUIRED 0.9 SEC. TRANSMISSION AT 11 KHZ FOR ABOUT 0.3 SEC. AND THE NON-LINEAR SWEEP BACK TO ZERO TODE ABOUT 0.3 SEC. THE FRAMES SEQUENCED THROUGH FOUR STEPS WHERE THE TRANSMISSIONS WERE ATTENUATED BY ZERO. 20. 20. THEN 40 DB. THUS REQUIRING 14 SEC FOR CHE COMPLETE CYCLE OF EXCITER OPERATION. THE EXCITER TRANSMITTED ON THE SHORT ANTENNAS AND THE

RECEIVER SENSED THE SIGNALS COUPLED BETWEEN THE TWO ANTENNAS BY THE AMBIENT PLASMA, PLUS ANY NOISE SIGNALS WHICH WERE EXCITED IN THE PLASMA. EXCITER OPERATION PERMITTED THE CONTROLLED STUDY OF ION RESONANCES IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE. THIS VLF EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC EIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.08 MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE-RECORDER CHANNELS DURING THE TIME THE TAPE RECORDER OPERATED (TO JANUARY 1970). TAPE-RECORDED (AND BACK-UP REAL TIME) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY. FURTHER DETAILS CAN BE FOUND IN THE 'ISIS A TECHNICAL PLAN."

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

NSSDC ID 69-009A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - I.B. MCDIARMID NATIONAL RSCH COUNCIL OTTAWA, ONTARIO, CANADA
DI - J.R. BURROWS NATIONAL RSCH COUNCIL OTTAWA, CATARIO, CANADA

# EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT CONSISTED OF FOUR SETS OF DETECTORS. THE FIRST SET. COMPRISING FOUR GEIGER COUNTERS, MEASURED ELECTRONS GREATER THAN 20 AND 40 KEV AND PROTONS GREATER THAN 300 AND 500 KEV PARALLEL TO AND PERPENDICULAR TO THE SATELLITE SPIN AXIS. ALL REMAINING DETECTORS MEASURED PARTICLES PERPENDICULAR TO THE SPIN AXIS. THE SECOND SET CONSISTED OF SOLID-STATE SILICON JUNCTION DETECTORS. THESE RESPONDED TO ELECTRONS GREATER THAN 25 AND 140 KEV, ELECTRONS IN THE RANGE 200 TO 770 KEV. AND PROTONS GREATER THAN 200 AND 400 KEV. THE THIRD SET CONSISTED OF 5 SILICON JUNCTION DETECTORS WHICH RESPONDED TO PROTONS EETWEEN 0.15 AND 30 MEV. THE FOURTH SET CONSISTED OF CESIUM IGDIDE SCINTILLATION-PHOTOMULTIPLIER SYSTEMS. EACH SYSTEM GPERATED IN TWO MCDES, AND RESPONDED TO ELECTRONS GREATER THAN 8. 40. AND 60 KEV AND PROTONS GREATER THAN 50 KEV AND IN THE RANGE 50 TO 70 KEV.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC FROBE

NSSDC ID 69-009A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - L.H. BRACE NASA-GSFC GREENELT. MD

### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM. AND TO STUDY CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS

CURRENT-VOLTAGE PROFILE. THE ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 48.3 CM FROM THE SC. ALONG THE SPIN AXIS. AND WAS CENTERED AMONG THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNDISTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HOR (ZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS FROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE THAT WAS FREE OF SC WAKE EFFECTS. THE PROEES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY ISOLATED, STAINLESS STEEL TUBES. THE DUTER (0.24-CM DIAM AND 23-CM LCNG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SPEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 23 CM OUTWARD FROM THE DUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM DUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE. A VOLT-AMPERE CURVE WAS OBTAINED FROM THE SAWTOOTH VOLTAGE (-2 TO PLUS 10 V) APPLIED TO THE COLLECTOR. THIS CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM SQ. AND TEMPERATURES FROM ABOUT 400 TO 50,000 DEG K.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SPHERICAL ELECTROSTATIC ANALYZER

NSSDC ID 69-009A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - R.C. SAGALYN AFCRL BEDFORD, MA

# EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THE SPHERICAL ELECTROSTATIC ANALYZER (SEA) EXPERIMENT WAS TO OBTAIN, BY DIRECT IN SITU MEASUREMENTS, A DESCRIPTION OF THE TEMPORAL AND SPATIAL VARIATIONS IN THE CONCENTRATIONS AND TEMPERATURES OF THE CHARGED PARTICLES, THROUGH THE ALTITUDE RANGE COVERED BY THE ISIS 1 SPACECRAFT. SPECIFICALLY, THE INSTRUMENTATION WAS DESIGNED TO MEASURE, 1 - THE ABUNDANCE OF THE THERMAL ION SPECIES THAT HAD CONCENTRATIONS FROM 10 IONS TO 6 TIMES 10 TO THE SIXTH IONS PER CC, USING A LOGARITHMIC DC AMPLIFIER INPUT CIRCUIT. 2 + THE KINETIC TEMPERATURES OF THERMAL IONS IN THE RANGE 700 TO 4000 DEG K. 3 - THE FLUX AND ENERGY SPECTRUM OF PROTONS IN THE RANGE 0-2 KEV. AND 4 - THE SPACECRAFT POTENTIAL WITH RESPECT TO THE UNDISTURBED AMBIENT PLASMA. THE SENSOR WAS COMPOSED OF CONCENTRIC SPHERICAL MESHED GRIDS WHICH ENCLOSED AN INNER COLLECTOR. THE GRID ELECTRODES WERE MADE OF TLAGSTEN MESH AND HAD A TRANSPARENCY OF 80 TO 90 PERCENT. THE SENSOR ASSEMBLY WAS MOUNTED ON A BOOM WHICH WAS DEPLOYED AFTER THE SOUNDER EXPERIMENT ANTENNA WAS EXTENDED.

CN 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RACIO BEACON

NSSCC 10 69-009A-09

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, DIECTHER INVESTIGATOR)
PI - P.A. FORSYTH WESTERN ONTARIO U LONDON, CATARIO, CANADA

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DEVISED TO STUDY THE IONOSPHERIC IRREGULARITIES GIVING SPECIAL ATTENTION TO THE DISTURBED LONGSPHERIC CONDITIONS. BEACON TRANSMITTERS ABGARD THE SATELLITE RADIATED POLARIZED RADID EMISSIONS ON COMMAND, AT 136.41 AND 137.95 MHZ. THE SIGNAL POLARIZATION, THE AMPLITUDE OF THE SIGNAL, THE RELATIVE PHASE OF THE SIGNAL, AND THE INCIDENT DIRECTION OF THE SIGNAL WERE OBSERVED FROM GROUND STATIONS. CCINCIDENT DESERVATIONS WERE MADE AT STATIONS ABOUT 100 WAVELENGTHS APART. FROM KNOWN SPACECRAFT POSITION INFORMATION AND THESE OBSERVATIONS, IONCSPHERIC IRREGULARITIES COULD BE ALMOST COMPLETELY DESCRIBED IN TERMS OF HEIGHT, HCRIZONTAL SIZE AND SHAPE. ELECTRON PEAK CONCENTRATION, AND RADIAL DISTRIBUTION OF ELECTRONS. AN IMPORTANT PART OF THESE DESCRIPTIONS WAS TO DRIGINATE FROM THE COMPUTED VALUES OF TUTAL ELECTRON CONTENT (TEC) OBTAINED FRIMARILY FROM THE POLARIZATION AND PHASE OBSERVATIONS. THE BEACON HAS BEEN OPERABLE SINCE LAUNCH, BUT IT HAS BEEN IMPRACTICAL TO CETAIN TEC MEASUREMENTS DUE TO POOR CHARACTERISTICS OF THE BEACON ANTENNA RADIATION PATTERN. USEFUL DATA HAVE BEEN DETAINED FROM THE INCIDENT DIRECTION, PHASE. AND AMPLITUDE MEASUREMENTS . REFERENCE "ISIS TECHNICAL PLAN," PP. E4. 85 FCR FURTHER DETAILS .

ON 01/30/70. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC RADIO NOISE

NSSDC 1D 69-009A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - T.R. HARTZ COMM RESEARCH CENTRE OTTAWA, ONTARIC, CANADA

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT USED THE SWEEP-FREQUENCY ICROSONDE RECEIVER AUTOMATIC GAIN CONTROL VOLTAGE TO MEASURE GALACTIC AND SOLAR RADIO NOISE LEVELS. THE RECEIVER SWEPT FROM 0.1 TO 20 MHZ. THE CYNAMIC RANGE WAS 50 CB. AND THE BANDWIDTH WAS 55 KHZ. THE ANTENNAS USED WERE 18.75-M AND 73.15-M CIPOLES.

ON 01/30/70. THE CATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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ASSDC ID 69-0468

SPACECRAFT COMMON NAME- OVE-6 ALTERNATE NAMES-ERS 26. 03951

SPACECRAFT WEIGHT IN GRBIT-10.44 KG LAUNCH DATE- 05/23/69

LAUNCH SITE- VANCENBERG AFE. UNITED STATES

LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY UNITED STATES

DOD-USAF

INITIAL OREIT PARAMETERS CEBIT PERIOC- 3115-2 MIN EPOCH DATE- 05/24/69 ORBIT TYPE- GEOCENTRIC PERIAPSIS- 16923. KM ALT INCLINATION-32.86 DEG APOAPSIS- 111636. KM ALT

RECENT ORBIT PARAMETERS CRBIT PERICD- 3115.5 MIN EPOCH DATE- 06/25/73 ORBIT TYPE- GEOCENTRIC INCLINATION- 27.434 DEG PERIAPSIS- 7378.65 KM ALT APDAPSIS- 121165. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FROJECT SCIENTIST) BEDFORD . MA REYNOLDS AFCRL PM - C.H. AFCRL BEDFORD, MA PS - K. Y AT ES

SPACECRAFT BRIEF DESCRIPTION

THE SATELLITE HAS A OCTAGONAL CONFIGURATION, IS SPIN-STABILIZED. AND WAS PLACED IN A MODERATELY ELLIPTICAL EARTH GROIT (ECCENTRICITY = 0.670) BY A TITAN 3C ON MAY 23, 1969. THE PURPOSE OF THE SATELLITE IS TO MONITOR X RAY. ELECTRON. AND PROTON RADIATION ASSOCIATED WITH SCLAR ACTIVITY IN ORDER TO DEVELOP DATA FANDLING TECHNIQUES IN NEAR REAL-TIME FOR USE BY THE AIR WEATHER SERVICE FORECAST CENTER IN FORECASTING SCLAF FLARES.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GEIGER-MUELLER TUBE. SOLAR X-RAY DETECTOR, 2 TO 12 A

NSSDC ID 69-0468-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) REDECRO. MA YATES PI - K.

EXPERIMENT BRIEF DESCRIPTION

TWO IDENTICAL GEIGER-MUELLER TUBES (EON 6213) WERE MOUNTED IN MUTUALLY ORTHOGONAL POSITIONS AT 45 DEG AND 135 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. THESE DETECTORS, WHICH HAVE MICA WINDOWS, MEASURED THE SOLAR X-RAY FLUX IN THE 2+ TO 12-A BAND. THIS EXPERIMENT HAD AN END-OF-LIFE TIMER SET TO TERMINATE OPERATION IN MID 1970. HOWEVER THIS MECHANISM DID NOT ACTIVATE AS SCHEDULED.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

NSSCC IC 69-0468-02 EXPERIMENT NAME- SOCIUM 100 IDE SCINTILLATOR. GANNA-RAY DETECTOR, 19 TO 1175 KEV

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD, MA

# EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO MONITOR SOLAR RADIATION FLUX IN FOUR BANDS RANGING FROM HARD X RAYS TO HARD GAMMA FAYS. A DETECTOR CONSISTING OF A SODIUM IODIDE CRYSTAL PHOTOMULITPLIER (DOPED WITH THALLIUM) WAS USED TO MEASURE SOLAR ELECTROMAGNETIC RADIATION IN THE 19- TO 76-KEV, 76- TO 232-KEV, 232- TO 1175-KEV, AND GREATER THAN 1175 KEV EANCS. THE SODIUM IODIDE CRYSTAL IS 0.5 IN. IN DIAMETER AND 0.5 IN. LONG. AND WAS CONTAINED IN A HERMETICALLY--SEALED ALUMINUM CAN WITH WALLS 0.010 IN. THICK. THICKNESS OF THE WALLS DETERMINED THE LOWER LIMIT OF THE DETECTOR'S SENSITIVITY. THE DETECTOR HAD AN AUTOMATIC END-OF-LIFE TIMER SET TO TERMINATE OPERATION IN MIO-1970. HOWEVER. THIS MECHANISM DID NOT ACTIVATE AS SCHEDULED.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PROTON ALPHA PARTICLE TELESCOPE

NSSOC IC 69-0468-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD, MA

### EXPERIMENT BRIEF DESCRIPTION

THIS TELESCOPE CONSISTS OF TWO TOTALLY DEPLETED SILICON SURFACE BARRIER DETECTORS. THE INSTRUMENT LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. PROTONS IN THE ENERGY RANGES 5.3+8, 8-17, 17-40, AND 40-100 MEV AND ALPHA PARTICLES IN THE ENERGY RANGES 20-32, 32-68, AND 68-100 MEV ARE MEASURED SEPARATELY. THE SATELLITE ROTATES A SIGNIFICANT AMOUNT DURING EACH COUNTING INTERVAL.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 08/12/72. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- LOW-ENERGY ELECTRON DETECTOR

NSSEC IC 69-0468-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD. MA

EXPERIMENT BRIEF DESCRIPTION

A PLASTIC SCINTILLATOR DETECTOR MEASURES THE OMNIDIRECTIONAL FLUXES OF ELECTRONS WITH ENERGIES GREATER THAN 40 KEV. THE CETECTOR HAS WORKED WELL FROM LAUNCH TO THE PRESENT (SEPTEMBER 1973).

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- VELA 5A hssdc id 69-046D. Alternate names- Vela 9 (TRW), 03954, Vela 5A (USAF)

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT IN ORBIT- 259.01 KG

LAUNCH SITE- VANDENBERG AFB. UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES DOD-USAF

UNITED STATES DOD-USA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERICD- 6720. MIN

APOAPS IS- 112000. KM ALT PERIAPS IS- 111000. KM ALT INCLINATION- 32.3 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC CRBIT PERIOD- 6720. MIN

APDAPSIS- 112000. KM ALT PERIAPSIS- 111000. KM ALT INCLINATION- 32.3 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - UNKNOWN USAF, SAMSO SAN BERNARDINO, CA

PS - J.H. COON LOS ALAMOS SCI LAB LCS ALAMOS, NM

### SPACECRAFT BRIEF DESCRIPTION

VELA 5A WAS ONE OF TWO SPIN-STABILIZED. ICOSAHEDRAL SATELLITES THAT COMPRISED THE FIFTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII. INCLINED AT 60 DEG TO THE ECLIPTIC. AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS. EUV. SOLAR PROTONS. SOLAR WIND. AND NEUTRONS: (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION. AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 5A. AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES. HAD BETTER COMMAND CAPABILITIES. INCREASED DATA STORAGE. IMPROVED POWER REQUIREMENTS. BETTER THERMAL CONTROL OF OPTICAL SENSORS. AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES CF 120 W WERE PROVIDED BY 22.500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

NSSDC ID 69-0460-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI + S.J. BAME LOS ALAMOS SCI LAB LOS ALAMOS. NM
OI - J.R. AS BRIDGE LOS ALAMOS SCI LAB LOS ALAMOS. NM

#### EXPERIMENT BRIEF CESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPERTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY

NSSCC ID 69-0460-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI = R.W. KLEBESADEL LOS ALAMOS SCI LAB LOS ALAMOS. NM

DI = I.B. STRONG LOS ALAMOS SCI LAB LOS ALAMOS. NM

DI = R.A. OLSON LOS ALAMOS SCI LAB LOS ALAMOS. NM

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE
SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY.
INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.2 TO 1.0 MEV WITH
A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE
SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS
BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED
OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS
CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE
INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF
LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED
CONTINUOUS TEMPORAL COVERAGE WHICH, COUFLED WITH THE ISOTROPIC RESPONSE. IS
UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH
RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT DUE TO COSMIC
PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE, WHICH
WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 150 CCUNTS/SEC.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- VELA 5B NSSDC ID 69-046E ALTERNATE NAMES- VELA 10 (TRW), 03955, VELA 5B (USAF)

SPACECRAFT WEIGHT IN GRBIT-259.01 KG LAUNCH DATE- 05/23/69

LAUNCH SITE- VANCENEERG AFE, UNITED STATES

LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY

UNITED STATES

DOD-USAF

INITIAL ORBIT PARAMETERS CEBIT PERIOC- 6720. MIN EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC APDAPSIS- 112000. KM ALT PERIAPSIS- 111000. KM ALT INCLINATION-32.8 DEG

RECENT ORBIT PARAMETERS

CRBIT PERICO- 6720. MIN EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC PER IAPSIS- 111000. KM ALT INCLINATION- 32.8 DEG APRIADS IS - 112000 - KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)

SAN BERNARDING. CA USAF, SAMSO UNKNOWN PM ++ LOS ALAMOS. NM

LOS ALAMOS SCI LAB COON PS - J.H.

SPACECRAFT BRIEF DESCRIPTION

VELA 58 WAS ONE OF TWO SPIN-STABILIZED. ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA FROGRAM. THE GREITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC. AND SFACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE DEJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS. SOLAR WIND, AND NEUTRONS. (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUFPCRT OF MANNED SPACE MISSIONS. VELA 58, AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES, HAD BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE. IMPROVED POWER REQUIREMENTS. BETTER THERMAL CONTROL OF OPTICAL SENSORS. AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22.500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL CRBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR X-RAY DETECTORS, .5 TO 3.0 A. 1 TO ASSOC 1D 69-046E-02 8 A. 1 TO 16 A. 44 TO 60 A

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CT+ER INVESTIGATOR)

PI - W.H. CHAMBERS LOS ALAMOS SCI LAB

LOS ALAMOS. NM

FULLER 01 - J.C.

LOS ALAMOS SCI LAB

LOS ALAMOS. NM

OI - W.E. KUNZ LOS ALAMOS SCI LAB

LOS ALAPOS. NM

### EXPERIMENT BRIEF DESCRIPTION

TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY OPPOSED APEX POSITIONS TO MONITOR SOLAR X RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ION CHAPBERS HAD A 1- TO 8-A WAVELENGTH RANGE, A 1- TO 16-A RANGE, AND A 1- TO 16-A AND A 44- TO 60-A RANGE. RESPECTIVELY. THE 44- TO 60-A SIGNAL WAS THE DIFFERENCE EETWEEN THE LAST TWO ION CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SO THAT THE TWO DETECTORS AFFORCED NEARLY 4-PI STERADIAN COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SOCIUM IDDICE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A. AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES

NSSDC ID 69-046E-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - S. SINGER LOS ALAMOS SCI LAB LOS ALAMOS, NM
OI - M.D. MONTGOMERY LCS ALAMOS SCI LAB LCS ALAMOS, NM

## EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND SO MEY AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS CESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM. TRITIUM. AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE. ORIENTED AT ANGLES OF 45 DEG. 90 DEG. AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG.) IN FRONT OF A SOLIC-STATE DE/DX VS E PARTICLE DETECTOR.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON DETECTORS

NSSCC ID 69-046E-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=(THER INVESTIGATOR)
PI - S. SINGER LOS ALAMOS SCI LAB LOS ALAMOS. NN
OI - M.D. MONTGOMERY LOS ALAMOS SCI LAB LCS ALAMOS. NM

#### EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MICH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAY IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG. 90 DEG. AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE: THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND EXPERIMENT

NSSCC ID 69-046E-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=CTHER INVESTIGATOR)

PI - S.J. HAME LOS ALAMOS SCI LAB LOS ALAMOS, NM

OI - J.R. ASBRIDGE LOS ALAMOS SCI LAB LOS ALAMOS. NM

OI - H.E. FELTHAUSER LOS ALAMOS SCI LAB LOS ALAMOS. NM

### EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RESISTANCE CAPACITOR (RC) TIME CONSTANTS. PARTICLES IN A 6-DEG BY 100-DEG FAN-SHAPED ANGULAR RANGE WERE ACCEPTED FOR ANALYSIS DUFING A DECAYING VOLTAGE CYCLE. THE 100-DEG DIMENSION WAS PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. ONE DETECTOR UNIT WAS USED TO STUDY MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 33 KEV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE BETWEEN 1 KV AND 8.3 KV. THE OTHER DETECTOR UNIT. WHICH FAILED, WAS DESIGNED TO STUDY SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 18.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES) IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQLISITION RATE BECAME STANDARD.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE: THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC RAYS

NSSCC 10 69-046E-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - J.f. CONNER LOS ALAMOS SCI LAB LOS ALAMOS, NM

DI - W.D. EVANS LOS ALAMOS SCI LAB LOS ALAMOS, NM

DI - R.C. BELIAN LOS ALAMOS SCI LAB LCS ALAMOS, NM

### EXPERIMENT ERIEF DESCRIPTION

THE COSMIC X-RAY DETECTOR WAS A LARGE-AREA (26 CM SQUARED) SODIUM 1001DE SCINTILLATOR WITH A 5-MIL BERYLLIUM WINDOW. THE EXPERIMENT WAS DESIGNED TO PROVIDE MEASUREMENTS OF THE LOCATION, INTENSITY, AND INTENSITY VARIATIONS OF NONSOLAR X-RAY SOURCES OVER A LONG FERIOD OF TIME. THE DETECTOR WAS SENSITIVE TO X-RAY PHOTONS IN TWO ENERGY INTERVALS - (3 TO 6 KEV AND 3 TO 12 KEV), AND WAS SUFFICIENTLY SENSITIVE TO MONITOR FROM SIX TO TWELVE GALACTIC X-RAY SOURCES. ANY ONE SOURCE WAS VIEWED FOR APPROXIMATELY 1 HR, AND EVERY 2 DAYS EACH SOURCE WAS BACK IN VIEW. THREE MODES OF READOUT WERE AVAILABLE - (1) THE REAL TIME NORMAL MODE, IN WHICH COUNTS FROM EACH ENERGY CHANNEL WERE TRANSMITTED EVERY SEC. (2) THE HIGH RESOLUTION MODE. IN WHICH ONLY THE 3- TO 12-KEV CHANNEL WAS STORED.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRON CETECTOR

NSSDC IC 69-046E-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: GI=CTHER INVESTIGATOR) PI - S.J. LOS ALAMOS SCI LAB LGS ALAMOS. NM 01 - J.R. ASBRIDGE LOS ALAMOS SCI LAB LCS ALANCS. NN

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DÉTECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- ATS 5

NSSDC 10 69-069A

ALTERNATE NAMES-PL-6928, ATS-E, GGSE, 04068

LAUNCH DATE- 08/12/69 SPACECRAFT WEIGHT IN ORBIT-821 • KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- ATLAS-AGEN

FUNDING AGENCY

UNITED STATES

NASA-USSA

INITIAL ORBIT PARAMÉTERS

EPOCH DATE- 08/23/69 ORBIT TYPE- GEOCENTRIC CRBIT PERIOD- 1463. MIN APDAPSIS- 36894.0 KM ALT PERIAPSIS- 35760.0 KM ALT - INCLINATION-

RECENT ORBIT PARAMETERS

EPOCH DATE- 08/23/69 ORBIT TYPE- GEOCENTRIC . CREIT PERICO- 1463. MIN APOAPSIS- 36894.0 KM ALT PERIAPSIS- 35760.0 KM ALT INCLINATION-2.6 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.V. FORDY CE NASA - GSFC GREENBELT, MD PS - T.L. AGGSON NASA-GSFC GREENBELT, MD

SPACECRAFT ERIEF DESCRIPTION

ATS 5 WAS AN EQUATORIAL-ORBITING. SYNCHRONOUS-ALTITUDE TECHNOLOGY SATELLITE INTENDED TO TEST VARIOUS COMMUNICATIONS AND EARTH DESERVATIONAL SYSTEMS. ALSO INCLUDED ON BOARD WERE PARTICLE. ELECTRIC FIELD. AND MAGNETIC FIELD EXPERIMENTS. BECAUSE OF A MALFUNCTION. THE INTENCED GRAVITY GRADIENT STABILIZATION MECHANISM COULD NOT BE DEPLOYED. AND ATS 5 WAS STABILIZED IN A SPINNING MODE ABOUT SPACECRAFT Z AXIS AT APPROXIMATELY 71 RPM. ALL EXPERIMENTS WHICH DEPENDED ON THE PLANNED GRAVITY GRADIENT STABILIZATION WE'RE ADVERSELY AFFECTED TO VARYING DEGREES. AND THE MISSION WAS DECLARED A FAILURE. HOWEVER, SOME OF THE SCIENCE EXPERIMENTS. INCLUDING THE MAGNETIC FIELD MONITOR AND THE PARTICLE EXPERIMENTS. RETURNED USABLE DATA DURING THE OPERATIONAL LIFETIME OF THE MISSION. ATS 5 WAS POSITIONED AT ABOUT 105 DEG WILLIAMS THE PACIFIC OCEAN. DATA WERE RECORDED ABOUT 60 PERCENT OF THE TIME THROUGH MOST OF THE SPACECRAFT'S OFFFATIONAL LIFETIME, WHICH EXTENDED TO JUNE 1, 1973. AFTER WHICH THE ACQUISITION RATE DECREASED FURTHER.

ON 06/01/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- CMN IDIRECTION AL HIGH-ENERGY PARTICLE NSSDC ID 69-069A-03
DETECTOR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - C.E. MCILWAIN U OF CALIFORNIA, SD SAN DIEGO, CA

#### EXPERIMENT BRIEF DESCRIPTION

THREE PLASTIC SCINTILLATOR DETECTORS, EACH WITH A 2-F1 SOLIC ANGLE FIELD OF VIEW, MEASURED ELECTRONS IN \$2 INTERVALS IN THE ENERGY RANGE 0.5 TO 5 MEV. SOLAR COSMIC RAYS WITH ENERGIES GREATER THAN 12. 16. AND 24 MEV WERE ALSO MEASURED. THE DETECTORS HAVE FUNCTIONED NORMALLY FROM LAUNCH TO AUGUST 1972 AFTER WHICH TIME THE DATA ACQUISITION WAS LIMITED TO SELECTED TIMES. THE SPACECRAFT SPIN DID NOT DEGRADE THE EXPERIMENT DATA.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

CN 08/00/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TRI-DIRECTIONAL MEDIUM-ENERGY PARTICLE - ASSCC ID 69-069A-04
DETECTOR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI = F.S. MOZER U OF CALIFORNIA, BERKELEY, CA

## EXPERIMENT GRIEF CESCRIPTION

THIS EXPERIMENT CONSISTED OF THREE ESSENTIALLY IDENTICAL SCINTILLATION PHOTOMULTIPLIER CETECTORS, EACH INTENDED TO MEASURE (SEPARATELY) ELECTRONS AND PRUTONS IN THREE ENERGY WINDOWS CENTERED RESPECTIVELY AT 40, 75, AND 120 KEV AND 60,120, AND 165 KEV. TWO DETECTORS, LOOKING IN OPPOSITE DIRECTIONS, WERE TILTED BY 12 DEG FROM THE SATELLITE 2 AXIS AND CNE WAS ORIENTED PERPENDICULAR TO THIS CONFIGURATION. OVER MOST OF ITS DATA COLLECTING LIFETIME, THE SATELLITE WAS SPINNING ABOUT ITS 2 AXIS. WITH A SPIN PERIOD OF 0.78 SEC. DUE TO AN UNPLANNED SPACECRAFT SPIN SOON AFTER LAUNCH, A SHUTTER SYSTEM WAS ACTIVATED THAT RENDERED THE PERPENDICULAR DETECTOR INEFFECTIVE. THEREFORE, MEASUREMENTS WERE MADE COLLY IN DIRECTIONS APPROXIMATELY PARALLEL AND ANTIPARALLEL TO THE LOCAL MAGNETIC FIELD. THE SPECIES ANALYSIS WAS PERFORMED BY A THREE-CHANNEL PULSE-HEIGHT ANALYZER, AND PARTICLE COUNTS WERE TELEMETERED IN BOTH ANALOG AND DIGITAL MODES. THE INTEGRATION TIME FOR EACH CHANNEL WAS 0.01 SEC. WHILE THE READOUT RATE FOR ANY ONE CHANNEL VARIED FROM

0.2 TO 5.12 SEC. DEPENDING ON A COMMANDABLE READOUT MODE. FOR FURTHER INFORMATION CONSULT -- "DEVELOPMENT OF A DOUBLE-LAYERED SCINTILLATOR FOR SEPARATING AND CETECTING LOW-ENERGY PROTONS AND ELECTRONS." EY F. S. MOZER. F. H. BOGOTT. AND C. W. BATES, JR.. IEEE TRANS. ON NUCL. SCI.. NS-15 (3), 144, 1965.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- BI-CIRECTIONAL LOW ENERGY PARTICLE
DETECTOR

NSSOC ID 69-069A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=CTHER INVESTIGATOR)

PI - C.E. MCILWAIN U DF CALIFORNIA: SD SAN DIEGO: CA

DI - R.W. FILLIUS U DF CALIFORNIA: SD SAN DIEGO: CA

OI - S. DEFOREST U DF CALIFORNIA: SD SAN DIEGO: CA

## EXPERIMENT BRIEF DESCRIPTION

THIS DETECTOR MEASURED ELECTRONS AND PROTONS IN 62 LOGARITHMICALLY EQUISPACED INTERVALS IN THE ENERGY RANGE 50 EV TO 50 KEV. FOUR CURVED-PLATE ELECTROSTATIC ANALYZERS AND CHANNELTRON MULTIPLIERS WERE USED. TWO APERTURES WITH 5 X 8 DEG VIEW ANGLES LOOKED PARALLEL TO, AND PERPENDICULAR TO, THE SPACECRAFT SPIN AXIS. RESPECTIVELY. THE DEFLECTION VOLTAGE WAS PROGRAMMED FOR EITHER A SCAN MODE (ONE STEP PER FRAME) OR A FEAK TRACKING MODE. IN THE SCAN MODE, A COMPLETE SEQUENCE (62 STEPS) WAS OBTAINED IN 20.5 SEC.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 08/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RACIO BEACON

NSSDC ID 69-069A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - A.V. DAROSA STANFORD U STANFORD, CA
OI - G-K. GARRIOTT STANFORD U STANFORD, CA

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF PHASE-COHERENT RADIO FREQUENCIES CONTINUOUSLY TRANSMITTED AT 137.350 AND 412.050 MH2 (3RD HARMONIC). THE TOTAL ELECTRON CONTENT ALONG THE PROPAGATION PATH WAS CALCULATED BY ANALYSIS OF THE FARADAY ROTATION ANGLE MEASUREMENTS ON THE LOWER FREQUENCY, OR ANALYSIS OF DIFFERENTIAL DOPPLER FREQUENCY RECORDINGS OF BOTH FREQUENCIES. LONGS PHERIC IRREGULARITIES AND SCINTILLATION WAS ALSO COSERVED.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

NSSDC ID 69-069A-13

# EXPERIMENT NAME- MAGNETIC FIELD MONITOR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - M. SUGIURA NASA-GSFC GREENBELT, MD
OI - R.A. LANGEL NASA-GSFC GREENBELT, MD

# EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT WAS DESIGNED TO STUDY THE PROCESSES TAKING PLACE ON THE AURORAL MAGNETIC SHELLS. IT WAS ALSO INTENDED TO PROVIDE CORRELATIVE DATA FOR THE OTHER EXPERIMENTS ON THE SATELLITE. THE EXPERIMENT WAS PART OF THE MAGNETIC STABILIZATION SYSTEM THAT WAS THE BACKUP FOR THE GRAVITY-GRADIENT STABILIZATION SYSTEM. THE SENSOR SYSTEM CONSISTED OF A TRIAXIAL FLUXGATE MAGNETOMETER. THE SYSTEM MEASURED THE MAGNETIC FIELD ALONG THREE AXES BY COMBINING A FINE RANGE (PLUS AND MINUS 25 GAMMAS) AND A COARSE RANGE OF 32 INCREMENTS (32.8 GAMMAS EACH) TO GIVE THE TOTAL RANGE OF PLUS AND MINUS 500 GAMMAS. THE FINE AND COARSE READINGS WERE SAMPLED ON THE PFM TELEMETRY AT 5-12-SEC INTERVALS. THE FINE READINGS ONLY WERE RECORDED ON THE PCH TELEMETRY AT 2.57-SEC INVERVALS. THE FCM COARSE REACINGS WERE SUBCOMMUTATED AT 95-SEC INTERVALS. A 10-GAMMA CALIBRATION PULSE WAS INITIATED TWICE A DAY FOR 5.6 MIN. THE FAST SPIN RATE OF THE SATELLITE. THE SLOW SAMPLE RATE OF THE DATA. AND THE RESULTING ALIASING PROBLEMS DEGRADED THE DATA IN THE SPIN PLANE. THE MAGNETOMETER ITSELF HAD OPERATED SATISFACTORILY SINCE LAUNCH AND HAD ABOUT A 50 PERCENT COVERAGE UP TO THE TIME WHEN THE SPACECRAFT WAS TURNED OFF.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- APOLLO 12 LM/ALSEP NSSDC 1D 69-099C ALTERNATE NAMES- 04246, ALSEP 12, LEW 12, APOLLO 12C

LAUNCH DATE- 11/14/69 SPACECRAFT WEIGHT IN GRBIT- 4379. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEFICLE- SATURN 5

FUNDING AGENCY
UNITED STATES
NASA-OMSF

SPACE CRAFT PERSONNEL (PM=PRCJECT MANAGER, PS=PROJECT SCIENTIST)

#### SPACECRAFT BRIEF DESCRIPTION

THE LUNAR MODULE (LM) WAS A TWO-STAGE VEHICLE DESIGNED FOR SPACE OPERATIONS NEAR AND ON THE MOON. THE LM STOOD 7 M HIGH AND WAS 9.4 M WIDE (DIAGONALLY ACROSS THE LANDING GEAR). THE ASCENT AND DESCENT STAGES OF THE LM OPERATED AS A UNIT UNTIL STAGING. WHEN THE ASCENT STAGE FUNCTIONED AS A

SINGLE SPACECRAFT FOR RENDEZVOUS AND DOCKING WITH THE COMMAND MODULE (CM). INCLUDED IN THE DESCENT STAGE WERE THE SIX APOLLO LUNAR SCIENTIFIC EXPERIMENT PACKAGE (ALSEP) EXPERIMENTS AND THE LUNAR SURFACE EXPERIMENT. THE ALSEP EXPERIMENTS INCLUDED (1) THE PASSIVE SEISMEGRAPH. WHICH WAS CESIGNED TO MEASURE SEISMIC ACTIVITY AND PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR, (2) THE SUPRATHERMAL ION DETECTOR, DESIGNED TO MEASURE THE FLUX COMPOSITION. ENERGY. AND VELOCITY OF LOW-ENERGY POSITIVE IONS. (3) THE COLD CATHODE ION GAUGE. DESIGNED TO MEASURE THE ATMOSPHERE AND ANY VARIATIONS WITH TIME OR SOLAR ACTIVITY SUCH ATMOSPHERE MAY HAVE. (4) THE CHARGED PARTICLE LUNAR ENVIRONMENT, DESIGNED TO MEASURE PARTICLE ENERGIES OF SOLAR PROTONS AND ELECTRONS THAT REACH THE LUNAR SURFACE AND TO PROVIDE DATA ON ENERGY DISTRIBUTION OF THESE SOLAR PARTICLES. (5) THE LUNAR SURFACE MAGNETOMETER (LSM) DESIGNED TO MEASURE THE MAGNETIC FIELD AT THE LUNAR SURFACE, AND (6) THE SOLAR WIND SPECTREMETER, WHICH MEASURED THE STRENGTH, VELOCITY, AND DIRECTIONS OF THE ELECTRONS AND PROTONS THAT EMANATE FROM THE SUN AND REACH THE LUNAR SURFACE.

ON 11/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND SPECTROMETER

NSSDC IC 69-099C-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.W. SNYDER NASA-JPL PASADENA, CA
OI - D.R. CLAY NASA-JPL PASADENA, CA
OI - M.M. NEUGEBAUER NASA-JPL PASADENA, CA

# EXPERIMENT BRIEF DESCRIPTION

THE SOLAR WIND SPECTROMETER WAS PART OF THE ALSEP PACKAGE LEFT ON THE LUNAR SURFACE BY APOLLO 12. IT CONSISTED OF SEVEN MUDULATED FARADAY CUPS OPENED TOWARD DIFFERENT. BUT SLIGHTLY OVERLAPPING. PORTIONS OF THE LUNAR SKY. THE INSTRUMENT WAS USED TO OBSERVE THE DIRECTICAAL INTERSITIES OF THE ELECTRON (6-1330 EV) AND POSITIVE ION (18-9780 EV) COMPONENTS OF THE SOLAR WIND AND MAGNETOTAIL PLASMA THAT STRIKE THE SURFACE OF THE MOON. THE SOLAR WIND SPECTROMETER OPERATED WELL FROM TURN-ON UNTIL NOVEMBER 5. 1971. WHEN TROUBLE WAS ENCOUNTERED IN TWO OF THE SPECTRAL ENERGY LEVELS.

ON 11/19/69. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/05/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC

NSSOC 10 69-099C-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=OTHER INVESTIGATOR)
PI ~ G.V. LATHAM U OF TEXAS GALVESTON: TX

## EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP PACKAGE. IT WAS LOCATED AND DEPLOYED 310 FT FROM THE LM IN THE VICINITY OF SURVEYOR III. THE SEISMOGRAPH EXPERIMENT MEASURED SEISMIC ACTIVITY OF THE MOON AND OBTAINED INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE DETECTED SURFACE TILT PRODUCED BY

TIDAL DEFORMATIONS MOONGUAKES. AND METECRITE IMPACTS. IT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE A SENSOR ASSEMBLY, LEVELING STOOL, THERMAL SHROUD. AND RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION WHICH TRANSMITTED THE DATA BACK TO EARTH.

ON 11/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID 69-0990-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, 01=0THER INVESTIGATOR)
PI - j.w. FREEMAN RICE U HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WAS PART OF THE ALSEP PACKAGE, STUDIED THE IONIC ENVIRONMENT OF THE MOON BY DETECTING FREE STREAMING AND THERMALIZED SQLAR WIND IONS AND THOSE IONS WHICH RESULT FROM LLTRAVICLET IONIZATION OF THE LUNAR ATMOSPHERE. A LOW-ENERGY CURVED PLATE ANALYZER, WITH A VELOCITY FILTER OF CROSSED ELECTRIC AND MAGNETIC FIELDS, DETERMINED THE PARTICLE FLUX IN SELECTED INTERVALS OVER THE RANGE 0.2 TO 48.6 EV PER UNIT CHARGE. ALLOWING SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU. ANOTHER ANALYZER WITHOUT A VELOCITY FILTER DETECTED HIGHER-ENERGY PARTICLES. AS IN THE SOLAR WIND. IN SELECTED ENERGY INTERVALS BETWEEN 10 AND 3500 EV. CUE TO THE ORIENTATION OF THE INSTRUMENT. THIS EXPERIMENT. EXCEPT IN THE SHEATH AND TAIL, DID NOT MAKE DIRECT SOLAR WIND MEASUREMENTS. HOWEVER, IT OID SEE UPSTREAMING PARTICLES. ETC.. FROM THE SHOCK. HIGH-VCLTAGE POWER SUPPLY ARCING— CAUSED SOME LOSS OF DATA. AFTER MARCH 18. 1970, THE INSTRUMENT WAS NOT OPERATED WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C.

ON 11/19/69. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/18/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- NIMBUS 4
ALTERNATE NAMES- NIMBUS-D. PL-701E. 04362

NSSDC IC 70~025A

LAUNCH DATE- 04/08/70

SPACECRAFT WEIGHT IN DRBIT-

585. KG

LAUNCH SITE- VANDENEERG AFB, UNITED STATES

LAUNCH VEHICLE- THORAD-AGE

FUNDING AGENCY
UNITED STATES

NASA-OSSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 05/04/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 107.1 MIN APUAPSIS- 1097.00 KM ALT PERIAPSIS- 1690.00 KM ALT INCLINATION- 99.9007 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC GEBIT PERIOD- 107-12 MIN APOAPSIS- 1099-26 KM ALT PERIAPSIS- 1087-52 KM ALT INCLINATION- 99-845 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - H. PRESS NASA-GSFC GREENEELT. MD

PS - W.P. NORDBERG NASA-GSFC GREENELT, ND

## SPACECRAFT BRIEF DESCRIPTION

NIMBUS 4. THE FOURTH IN A SERIES OF SECOND-GENERATION METEGROLOGICAL R AND D SATELLITES. WAS DESIGNED TO SERVE AS A STABILIZED. EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A RING-SHAPED SENSOR MOUNT. (2) SOLAR PADDLES, AND (3) THE CONTROL HOUSING UNIT. WEICH WAS CONNECTED TO THE SENSOR MOUNT BY A TRUSS STRUCTURE. SHAPED SOMEWHAT LIKE AN OCEAN BUDY. NIMBUS 4 WAS NEARLY 3.7 M TALL, 1.5 M IN CIAMETER AT THE BASE, AND ABOUT 3 M ACROSS WITH SOLAR PADDLES EXTENDED. THE TORUS-SHAPED SENSOR MOUNT. WHICH FORMED THE SATELLITE EASE, HOUSED THE ELECTFONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS RING PROVIDED A MOUNTING SPACE FOR SENSORS AND TELEMETRY ANTENNAS. AN H-FRAME STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGER EXPERIMENTS AND TAPE RECORDERS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WAS LOCATED ON TOP OF THE SPACECRAFT, WERE SUN SENSORS. HORIZON SCANNERS, GAS NOZZLES FOR ATTITUDE CONTROL. AND A COMMAND ANTENNA. USE OF AN ADVANCED ATTITUDE CONTROL SUBSYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO SE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG FOR ALL THREE AXES (PITCH, ROLL, AND YAW). PRIMARY EXPERIMENTS CONSISTED OF (1) AN IMAGE DISSECTOR CAMERA SYSTEM (IDCS) FOR PROVIDING DAYTIME CLOUDCOVER PICTURES BOTH IN REAL-TIME AND RECORDED MODES. (2) A TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAYTIME AND NIGHTTIME SURFACE AND CLOUDTOP TEMPERATURES AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE. (3) AN INFRARED INTERFEROMETER SPECTROMETER (IRIS) FOR MEASURING THE EMISSION SPECTRA OF THE EARTH/ATMOSPHERE SYSTEM. (4) A SATELLITE INFRAREC SPECTROMETER (SIRS) FOR DETERMINING THE VERTICAL PROFILES OF TEMPERATURE AND WATER VAPOR IN THE ATMOSPHERE. (5) A MENITCR OF ULTRAVIOLET SCLAR ENERGY (MUSE) FOR DETECTING SOLAR UV RADIATION, (6) A BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER FOR MONITORING THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC DZONE ON A GLOBAL SCALE. (7) A FILTER WEDGE SPECTROMETER (FWS) FOR ACCURATE MEASUREMENT OF IR RADIANCE AS A FUNCTION OF WAVELENGTH FROM THE EARTH/ATMOSPHERE SYSTEM. (8) A SELECTIVE CHOPPER RADIGMETER (SCR) FOR DETERMINING THE TEMPERATURES OF SIX SUCCESSIVE 10-KM LAYERS IN THE ATMOSPHERE FROM ABSORPTION MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND, AND (9) AN INTERROGATION, RECORDING, AND LOCATION SYSTEM (IGLS) FOR LOCATING, INTERFOGATING, RECORDING, AND RETRANSMITTING METECROLOGICAL AND GEOPHYSICAL DATA FROM REMOTE COLLECTION STATIONS. THE SPACECRAFT OPERATION WAS A SUCCESS, AND IT PERFORMED NORMALLY UNTIL APRIL 8, 1971, WHEN THE YAW GYRO FAILED. CAUSING THE SPACECRAFT TO FACE BACKWARDS IN GRBIT. IT WAS SUCCESSFULLY TURNED AROUND ON MAY 12. 1971. YAW PROBLEMS CONTINUED TO AFFECT THE SPACECRAFT THEREAFTER.

ON 04/08/71. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR UV MONITOR

NSSDC ID 70-025A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - D.F. HEATH NASA-GSFC GREENEELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 MONITOR OF ULTRAVIOLET SOLAR ENERGY (MUSE) EXPERIMENT WAS DESIGNED (1) TO LOOK FOR TEMPORAL VARIATIONS IN THE SCLAR UV FLUX IN FIVE BANDS FROM 1150 TO 2300 A. (2) TO MEASURE THE SOLAR FLUX IN THESE REGIONS. AND (3) TO MEASURE THE ATMOSPHERIC ATTENUATION AT THESE WAVELENGTHS AS THE SENSORS ON BOARD VIEWED THE SETTING SUN AFTER THE SPACECRAFT HAD CROSSED THE TERMINATOR IN THE NORTHERN HEMISPHERE. THE SENSORS HAD THEIR MAXIMUM RESPONSES AT 1216 A (PLUS A 1350- TD 1600-A CONTINUUM), 1800 A, 2100 A, 2800 A. AND 2600 A (INCLUDING A 2600- TO 330C-A INTERVAL). THE 1216-A. 1800-A. AND 2600-A SENSORS WERE IDENTICAL TO THOSE CARRIED ON NIMBUS 3, WHILE THE 2100-A AND 2800-A SENSORS, UTILIZING INTERFERENCE FILTERS, WERE NEW AND REPLACED THE TWO THAT MALFUNCTIONED ON NIMBUS 3. THE MUSE INSTRUMENT. WHICH CONSISTED OF FIVE VACUUM PHOTODIODES HOUSED IN AN ELECTRONICS PACKAGE AND A SENSOR PACKAGE, WAS MOUNTED IN THE REAR OF THE NIMBUS SPACECRAFT. ALL SENSORS EXCEPT THE 1216-A PHOTODIODE HAD SEMITRANSFARENT PHOTOCATHODES THAT WERE DEPOSITED ON AN ALUMINUM DXIDE WINDOW. THE 1216-A SENSOR HAD A SOLID TUNGSTEN CATHODE. THE SPECTRAL REGIONS OF THE SUN TO WHICH THREE OF THE SENSURS RESPONDED (1216 A. 1800 A. AND 2600 A) WERE DETERMINED BY FILTER TRANSMITTANCE ON THE SHORT WAVELENGTH SIDE, WHILE THE LONG WAVELENGTH CUTOFFS WERE PROCUCED BY THE VARYING DEGREES OF CHACITY OF THE PHOTOCATHODE MATERIALS. THE SHORTWAVE CUTOFFS FOR THE 2100-A AND 2800-A SENSORS, FOWEVER. WERE DETAINED BY THE INTERFERENCE FILTERS, WHILE THE CESIUM TELLURIDE PHOTOCATHODE PROVIDED THE LONGWAVE CUTOFF. THE AFFRCERIATE BANDS OF UV FLUX ENTERED THE PHOTODIQUES AND PRODUCED A CURRENT THAT WAS MEASURED BY AN ELECTROMETER AND DIGITIZED BY THE NIMBUS VERSATILE INFORMATION PROCESSOR (VIP) SYSTEM. THE VIP DATA WERE STORED ON MAGNETIC TAPE AND TRANSMITTED ON PLAYBACK TO THE DATA ACQUISITION FACILITY. THE INSTRUMENT COULD OPERATE IN EITHER THE AUTOMATIC OR MANUAL MODE. IN THE AUTOMATIC MODE, THE INSTRUMENT HAD A BASIC 48-SEC CYCLE AND AN ANALOG-TC-DIGITAL CONVERSION RATE OF TWO SAMPLES PER SEC. IN THE MANUAL MODE, THE INSTRUMENT LOCKED ON A SELECTED SENSOR AND REMAINED THERE (TWO SAMPLES/SEC) UNTIL THE INSTRUMENT WAS COMMANDED BACK INTO THE AUTOMATIC MODE. THE FIELD OF VIEW OF THE SENSORS WAS ABOUT 90 DEG. WITH THE CENTER OF THE FIELD OF VIEW FARALLEL TO THE SPACECRAFT VELOCITY VECTOR. SOLAR ACQUISITION, THEREFORE, BEGAN AT 45 DEG PRIOR TO THE EARTH DAY/NIGHT TERMINATOR AND COMPLETELY CRASED AT THE SATELLITE DAY/NIGHT TRANSITION. THE INSTRUMENT HAD ONLY AN IN-FLIGHT ELECTRICAL CALIERATION SEQUENCE, BECAUSE THERE ARE NO KNOWN SUITABLE UV SOURCES THAT CAN PROVIDE AN IN-FLIGHT OPTICAL CALIBRATICA.

ON 04/08/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- BACKSCATTER ULTRAVIOLET (BUV)
SPECTROMETER

NSSDC ID 70-025A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) GREENBELT. MD PI - 0.F. HEAT H NASA-GSEC BOULDER. CC NATE CHTR ATMES RECH DI - JiV. DAVE 01 - A.J. GREENBELT. MD KRUEGER NASA-GSEC NATE CHTR ATMOS RSCH BOULDER: CO GI - C.L. MATEEP

## EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER EXPERIMENT WAS DESIGNED TO MONITOR THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE BY MEASURING THE INTENSITY OF ULTRAVIOLET RADIATION BACKSCATTERED BY THE EARTH/ATMOSPHERE SYSTEM DURING DAY AND NIGHT IN THE 2500- TO 3400-A SPECTRAL BAND. THE PRIMARY INSTRUMENTATION CONSISTED OF A DOUBLE MONOCHROMATOR CONTAINING ALL REFLECTIVE OPTICS AND A PHOTOMULTIPLIER DETECTOR. THE DOUBLE MONOCHROMATOR WAS COMPOSED OF TWO FASTIE-EBERT-TYPE MONOCHROMATORS IN TANDEM. EACH MONOCHROMATOR HAT A 64- BY 64-MM GRATING WITH 2400 LINES PER MM. LIGHT FROM A 0.05-STER SOLIC ANGLE (SUBTENDING APPROXIMATELY A 222-KM-SQUARE AREA ON THE EARTH'S SURFACE FROM A SATELLITE HEIGHT OF APPROXIMATELY 1100 KM) ENTERED THE NACIR-POINTING INSTRUMENT THROUGH A DEPOLARIZING FILTER. A MUTUR-DRIVEN CAM STEP ROTATED THE GRATINGS TO MENTIOR THE INTENSITY OF 12 OZONE ABSORPTION WAVELENGTHS. THE DETECTOR WAS A PHOTOMULTIPLIER TUBE. FOR BACKGROUND READINGS. A FILTER PHOTOMETER MEASURED THE REFLECTED ULTRAVIOLET RADIATION IN AN OZONE FREE ABSORPTION AREA NEAR 3800 A. SIGNALS FROM BOTH UNITS WERE READ BY SEPARATE RANGE-SWITCHING ELECTROMETERS WITH SEVEN RANGES. THE BUY EXPERIMENT CYCLE REQUIRED 6144 SEC. EACH CYCLE. IN TURN. WAS DIVIDED INTO 192 BUY FRAMES OF 32-SEC DURATION. CALIBRATICS BY ONED ARE LIGHT SOURCES WAS PERFORMED IN 26 OF THE 192 FRAMES. THE CTHER FRAMES WERE USED FOR EXPERIMENTAL DATA. CURING EACH OF THESE DATA FRAMES. THE MENCCHROMATOR MEASURED THE INTENSITY OF THE UV RADIATION IN EACH OF THE 12 WAVELENGTH BANDS WHILE THE PHOTOMETER MEASURED THE UV INTENSITY IN A SINGLE WAVELENGTH BAND. THE DWELL TIME AT EACH WAVELENGTH WAS 1.8 SEC. AND. DURING THIS INTERVAL, FOUR ANALOG UV INTENSITY MEASUREMENTS WERE TAKEN AT 400-MSEC INTERVALS IN ACCITION TO AN INTEGRATED PULSE COUNT MEASUREMENT OF THE UV INTENSITY AND ENERGETIC PARTICLE FLUX. ONCE EACH CRBIT, THE FIELD OF VIEW WAS CHANGED TO MONITOR THE SUN OR MOON DIRECTLY. THE MEASUREMENT RANGE OF THE SIGNAL CURRENT WAS FROM 0.2 TO 3000 NICROAMPS. THE VERTICAL DISTRIBUTION OF GZONE WAS DETAINED BY MATHEMATICAL INVERSION TECHNIQUES. FOR A COMPLETE DESCRIPTION OF THE BUY EXPERIMENT, SEE SECTION 7 IN \*THE NIMBUS IV USER\*S GUIDE."

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

CN 04/06/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- INTERRUGATION. RECORDING. AND LOCATION - NSSCC ID 70-025A-07 SYSTEM (IRLS)

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR)
PI - C.E. COTE NASA-GSFC GREENBELT. MD

## EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 INTERROGATION. RECORDING. AND LOCATION SYSTEM (IRLS) EXPERIMENT WAS DESIGNED TO COLLECT AND RETRANSMIT METECROLOGICAL, GEDPHYSICAL. AND OTHER EXPERIMENTAL DATA FROM RENCTE UNMANNED DATA COLLECTION STATIONS (PLATFORMS) DEPLOYED ON A GLOBAL SCALE. THE IRLS COULD ALSO DETERMINE THE LOCATION AND TRACK THE MOVEMENT OF SUCH PLATFORMS AS BALLOONS, OCEAN BUDYS. AND SHIPS TO WITHIN AN ACCURACY OF 2 KM. THE IRLS CONSISTED OF (1) A 466-MHZ RECEIVER. (2) A 401.5-MHZ TRANSMITTER. (3) DECODING AND CODING CIRCUITS, (4) A RANGE DETECTOR. AND (5) A 100-KB SATELLITE DATA MEMORY CAPABLE OF STORING DATA OBTAINED DURING EACH ORBIT FOR UP TO 370 DIFFERENT INTERROGATIONS. ON EACH ORBIT PASS. WHEN THE SATELLITE

WAS WITHIN RANGE OF AN ACQUISITION AND COMMAND STATION, THE SATELLITE COMMAND MEMORY WAS PROGRAMMED TO COMMUNICATE WITH SELECTED PLATFORMS DURING THE COMING GREIT. THE SATELLITE STORED ECTH THE ADDRESS (NUMBER) OF EACH PLATFORM AND THE DESIRED TIME THAT EACH SHOULD BE CONTACTED. AT THE APPROPRIATE TIME IN ORBIT. THE SATELLITE INTERROGATED EACH PLATFORM, MEASURED THE SATELLITE TO PLATFORM DISTANCE BY DETERMINING THE ROUND TRIP PROPAGATION TIME OF THE RE SIGNAL. RECEIVED THE ANALOG DATA FROM THE PLATFORM, CONVERTED IT TO DIGITAL FORM, AND STORED IT. UPON RETURN TO THE LOCALE OF THE GROUND STATION. THE STATICA COMMANDED THE SATELLITE TO TRANSMIT THE STORED DATA AND TO ACCEPT NEW COMMANDS FOR THE NEXT ORBIT. THE EXPERIMENT WAS INITIALLY A SUCCESS -- HOWEVER, CHING TO SPACECRAFT YAW PROBLEMS, THE AMOUNT OF USEFUL DATA PRODUCED AFTER APRIL 1971 WAS EXTREMELY LIMITED. A LISTING OF IRLS TRACKING DATA FROM CONSTANT-LEVEL BALLOOMS (30 AND 50 MB) APPEARS IN THE \*NIMBUS 4 DATA CATALOG. \* VOLUME 4. COPIES OF COMPUTER OUTPUTS FROM INDIVIDUAL PLATFORM EXPERIMENTS ARE RETAINED AT THE NIMBUS/ATS DATA UTILIZATION CENTER, NASA-GSFC, GREENBELT, MD.

ON 04/08/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SELECTIVE CHOPPER RADIOMETER (SCR)

NSSDC ID 70-025A-10

## EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 SELECTIVE CHOPPER RADIOMETER (SCR) OBSERVED THE EMITTED INFRARED RADIATION IN THE 15-MICRON ABSORPTION BAND OF CAREON DIGXIDE. FROM THESE MEASUREMENTS THE TEMPERATURE OF SIX SUCCESSIVE 10-KM LAYERS OF THE ATMOSPHERE WERE CETERMINED FROM EARTH OR CLOUDTOP LEVEL TO 60-KM HEIGHT. HEIGHT RESOLUTION WAS DETAINED BY A COMMINATION OF OPTICAL MULTI-LAYER FILTERS AND SELECTIVE ABSORPTION OF RADIATION USING CARBON CIOXIDE-FILLED CELLS WITHIN THE EXPERIMENT. THE SCR HAD SIX CHANNELS, WHICH WERE ARRANGED IN THREE UNITS OF TWO. THE FOUR LOWER CHANNELS WERE CALLED SINGLE CELL CHANNELS. THE UPTICS OF EACH CHANNEL CONSISTED OF A CANTILEVER-MOUNTED BLADE SHUTTER THAT OSCILLATED AT 10 HZ AND SUCCESSIVELY CHOPPED THE FIELD OF VIEW BETWEEN EARTH AND SPACE. THE CHOPPED RADIATION WAS THEN PASSED THROUGH A 10-CM PATH LENGTH OF CARBON DIOXIDE, THE PRESSURE BEING SET FOR EACH CHANNEL TO DEFINE THE VIEWING DEPTH OF THE ATMOSPHERE. BEHING THE CAREON DIOXIDE PATH WAS A NARROW-BAND FILTER. THE CENTERS OF WHICH WERE DIFFERENT FOR EACH CHANNEL. AND A LIGHT PIPE WHICH CONVERGED THE RADIATION ON A THERMISTOR BULUMETER DETECTOR. TO OBTAIN ADEQUATE HEIGHT RESCLUTION IN THE UFFER LAYERS OF THE ATMOSPHERE. THE UPPER TWO CHANNELS OPERATED ON A SLIGHTLY DIFFERENT PRINCIPLE AND WERE KNOWN AS DOUBLE CELL CHANNELS. THE TECHNIQUE CONSISTED OF SWITCHING THE RACIATION BETWEEN TWO HALF-CELLS. SEMICIRCULAR IN SHAPE AND CF 1-CM PATH LENGTH. CONTAINING DIFFERENT PRESSURES OF CARBON DICXIDE. A MOVABLE 45-DEG MIRROR WAS USED IN PLACE OF THE OSCILLATING SHUTTER USED IN THE LUWER FOUR CHANNELS. DURING ONE HALF-PERIOD. EARTH RACIATION PASSED THROUGH ONE HALF-CELL AND SPACE RADIATION THROUGH THE OTHER. THE SITUATION WAS REVERSED DURING THE OTHER HALF-PERIOD. THE RADIATION THEN PASSED THROUGH A LIGHT PIPE UNTO A THERMISTOR BOLDMETER DETECTOR. INFLIGHT CALIBRATION WAS CARRIED OUT BY VIEWING OF AN INTERNAL REFERENCE BLACKBODY OF KNOWN TEMPERATURE PRICE TO THE VIEW OF SPACE. THE OUTPUT OF EACH CHANNEL WAS

SAMPLED ONCE EVERY SECOND. FOR A COMPLETE DESCRIPTION OF THE SCR. SEE SECTION 9 IN "THE NIMBUS IV USER"S GUIDE." THE CHANNEL 1 TEMPERATURE MONITORING SYSTEM FAILED ON JUNE 15. 1970. THEREBY REDUCING THE ACCURACY OF THE SCR DATA.

ON 04/08/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/15/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTI AL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- VELA 64 NSSDC ID 70-027A ALTERNATE NAMES-PL-7028, VELA 11 (TRW), 04366, VELA 6A (USAF)

LAUNCH DATE- 04/08/76 SPACECRAFT WEIGHT IN GRBIT-259.01 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- TITAN 3

FUNDING AGENCY UNITED STATES

DOD-USAF

INITIAL ORBIT PARAMETERS

EPOCH DATE- 04/05/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOC- 6729. MIN APDAPSIS- 112160. KM ALT PERIAPSIS- 111210. KM ALT INCLINATION- 32.41 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 04/17/71 ORBIT TYPE- GEOCENTRIC CEBIT PERIOD- 6701-1 MIN KM ALT PERIAPSIS- 111139. KM ALT INCLINATION- 33.4673 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -UNKNOWN

PS - J.H.

USAF, SANSO

SAN BERNARDING. CA

LOS ALAMOS SCI LAB LOS ALAMOS, NM

# COON SPACECRAFT BRIEF DESCRIPTION

VELA 6A WAS ONE OF TWO SPIN-STABILIZED. ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA FROGRAM. THE CREITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH FADII . INCLINED AT 60 DEG TO THE ECLIPTIC. AND SPACED 180 DEG APART. THUS PROVIDING A MUNITURING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE DEJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSNIC X RAYS, EUV. SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION. AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 6A WAS AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES HAVING BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE. IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. ROTATION RATES OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY. THE LAUNCH OF VELA 64 AND 68. PLUS THE TWO ACTIVE VELAS STILL IN GRBIT (VELA SA AND E). COMPLETED THE COJECTIVES OF THE VELA PROGRAM.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR X-RAY DETECTORS. .5 TO 3.0 A. 1 TO NEEDC ID 70-0274-02 B A. 1 TO 16 A. 44 TO 60 A

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR) LOS ALAMOS SCI LAB LOS ALAMOS. NM CHAMBERS PI - WoHo LOS ALAMOS. NM LOS ALAMOS SCI LAB Of - J.C. FULLER LOS ALANOS . NM LOS ALAMOS SCI LAB KUN7 OI - WoE.

# EXPERIMENT BRIEF DESCRIPTION

TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY CPFOSED APEX POSITIONS TO MONITOR SOLAR X RAYS IN SELECTED BANDS FRC# 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE SCINTILLATOR-PROTOMULTIPLIER. THE THREE ICH CHAMBERS HAD A 1- TO 8-A WAVELENGTH RANGE. A 1- TO 16-A RANGE. AND A 1- TO 16-A AND 44- TO 60-A RANGE, RESPECTIVELY. THE 44- TO 50-A SIGNAL WAS THE DIFFERENCE BETWEEN THE LAST TWO ION CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SC THAT THE TWO DETECTORS AFFORCED NEARLY 4-PI STER COVERAGE. THE FEURTH SENSOR WAS COMPOSED OF SODIUM TOD THE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A. AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG a

OM 04/08/70" THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES

NSSDC ID 70-027A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) LOS ALAMOS SCI LAB LOS ALAMOS. NM SINGER PI - S. LOS ALAMOS. NM LOS ALAMOS SCI LAB MONT GOMERY OI - M.D.

# EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTEINS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM. TRITIUM. AND FELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SCLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY I ONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE. ORIENTED AT ANGLES OF 45 DEG. 90 DEG. AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG) IN FRONT OF A SOLIC-STATE DE/DX VS E PARTICLE DETECTOR.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/700 THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME+ ELECTRON DETECTORS

NSSDC ID 70-0274-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR) PI  $\sim$  S. SINGER LOS ALAMOS SCI LAB LOS ALAMOS, NM OI  $\sim$  M.O. MONTGOMERY LOS ALAMOS SCI LAB LOS ALAMOS, NM

## EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO DESERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ITS ABILITY TO DESERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT-VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAID IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG. 90 DEG. AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE: THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND EXPERIMENT

NSSDC ID 70-0274-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - S.J. BAME LOS ALAMOS SCI LAB LOS ALAMOS, NM
OI - J.R. ASBRIDGE LOS ALAMOS SCI LAB LOS ALAMOS, NM
OI - H.E. FELTHAUSER LOS ALAMOS SCI LAB LOS ALAMOS, NM

# EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. PARTICLES IN A 6- BY 100-DEG FAN-SHAPED ANGULAR RANGE WERE ACCEPTED FOR ANALYSIS DURING A DECAYING VOLTAGE CYCLE. THE 100-DEG DIMENSION WAS PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. CHE ANALYZER MULTIPLIER UNIT STUDIED SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 18.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES). IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV. THE OTHER UNIT STUDIED MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 33 KEV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE EETWEEN 1 AND 8.3 KV.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/12/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

NSSCC ID 70-027A-07

EXPERIMENT NAME- NEUTRON DETECTOR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, QI=CTFER INVESTIGATOR)
PI - S.J. BAME LOS ALAMOS SCI LAB LOS ALAMOS, N.M.
DI - J.R. ASBRIDGE LOS ALAMOS SCI LAB LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTICAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MCDERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTORS ABOVE 25 MEV.

ON 04/08/70. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY

NSSEC ID 70-027 A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR)

PI - R.W. KLEBESACEL LOS ALAMOS SCI LAB LOS ALAMOS. NM

OI - I.B. STRONG LOS ALAMOS SCI LAB LOS ALAMOS. NM

OI - R.A. GLSON LOS ALAMOS SCI LAB LOS ALAMOS. NM

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY CEPOSITICNS OF 0.3 TO 1.5 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS FROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID. STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINOUS TEMPORAL COVERAGE WHICH. COUPLED WITH THE ISCTROPIC RESPONSE, WAS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT, DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE CBSERVED EACKGROUND RATE. WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 20 COUNTS/SEC.

ON 04/08/70. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- VELA 68

NSSCC IC 70-0278

ALTERNATE NAMES- PL-702C, VELA 12 (TRW), 04368, VELA 68 (USAF)

LAUNCH DATE- 04/08/70 SPACECRAFT WEIGHT IN CRBIT-259.01 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- TITAN 3

FUNDING AGENCY

UNITED STATES

DOD-USAF

INITIAL OREIT PARAMETERS

EPOCH DATE- 04/11/70 ORBIT TYPE- GEOCENTRIC CRBIT PERIOC- 6745. MIN APDAPSIS- 112160. KM ALT PERIAPSIS- 111500. KM ALT INCLINATION- 32.52 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 04/18/71 ORBIT TYPE- GECCENTRIC CRBIT PERICO- 6698.2 MIN KM ALT PERIAPSIS- 111073. KM ALT INCLINATION- 33.3150 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. FS=PROJECT SCIENTIST)

UNKNOWN

PS - J.H.

USAF. SAMSO

SAN BERNARDING, CA

LOS ALAMOS SCI LAB LOS ALAMOS, NM

COON SPACECRAFT BRIEF DESCRIFTION

> VELA 68 WAS ONE OF TWO SPIN-STABILIZED, ICCSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA FREGRAM. THE GREITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC. AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE DEJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND CESMIC X RAYS, EUV. SCLAR PROTONS, SCLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION: AND (3) TO PROVIDE SOLAR FLARE DATA IN SUFFORT OF MANNED SPACE MISSIONS. VELA 68 WAS AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES HAVING BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE. IMPROVED POWER REQUIREMENTS, BETTER THERNAL CONTROL OF CETICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE FROVICED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL CREIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GREUND COMMANDS AND TELEMETRY. THE LAUNCH OF VELA 64 AND 68. PLUS THE TWO ACTIVE VELAS STILL IN ORBIT (VELA SA AND B), COMPLETED THE OBJECTIVES OF THE VELA PROGRAM.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR X-RAY DETECTORS. .5 TO 3.0 A. 1 TO NSSDC ID 70-0278-02 8 A. 1 TO 16 A. 44 TO 60 A

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - W.H. CHAMBERS

LUS ALAMOS SCI LAB LCS ALAMOS. NM

81 - J.C. FULLER 01 - W.E. KUNZ

LOS ALAMOS SCI LAB LOS ALAMOS SCI LAB

LOS ALAMOS, NA LOS ALAMOS: NM

EXPERIMENT ERIEF CESCRIPTION

TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY CFFOSED APEX POSITIONS TO MONITOR SCLAR X RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE

SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ICN CHANGERS HAD A 1- TO 8-A WAVELENGTH RANGE. A 1- TO 16-A RANGE, AND 1- TO 16-A AND 44- TO 60-A RANGE. RESPECTIVELY. THE 44- TO 60-A SIGNAL WAS THE DIFFERENCE BETWEEN THE LAST TWO IGN CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SC THAT THE TWO DETECTORS AFFORDED NEARLY 4-PI STER COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SODIUM IODIDE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A. AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TC -70 DEG.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES

NSSDC 1D 70-0278-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - S. SINGER LOS ALAMOS SCI LAB LOS ALAMOS, N.M.

DI - M.D. MONTGOMERY LCS ALAMOS SCI LAB LCS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND FELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY ICNIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG. 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CUNSISTED OF A COLLINATING THEE (PROVIDING AN ANGULAR VIEW OF 30 DEG.) IN FRONT OF A SOLIC-STATE DE/DX VS E PARTICLE DETECTOR.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON DETECTORS

NSSDC ID 70-0278-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=OTFER INVESTIGATOR)
PI - S. SINGER LOS ALAMOS SCI LAB LOS ALAMOS. NM
DI - M.D. MONTGOMERY LOS ALAMOS SCI LAB LOS ALAMOS. NM

EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTERS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO CESERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE CTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ITS ABILITY TO DESERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT-VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAID IN A SINGLE PLANE AND WADE ANGLES OF 45 DEG. 90 DEG. AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

UN 04/08/70. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRON DETECTOR

NSSCC IC 70-0278-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - S.J. BAME
LCS ALAMOS SCI LAB LGS ALAMOS, NM
OI - J.R. ASBRIDGE LOS ALAMOS SCI LAB LGS ALAMOS, NM

## EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURREUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MCDERATOR AND CETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 NEV.

GN 04/08/70. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY

NSSDC ID 70-0278-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI#CTHER INVESTIGATOR)
PI = R.W. KLEBESADEL LOS ALAMOS SCI LAB LOS ALAMOS. NM
OI = I.B. STRONG LOS ALAMOS SCI LAB LUS ALAMOS. NM
OI = R.A. OLSON LOS ALAMOS SCI LAB LOS ALAMOS. NM

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM ICDIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIOUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.3 TO 1.5 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED DUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO CCUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID. STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAFABILITY PROVIDED CONTINUOUS TEMPORAL COVERAGE WHICH. COUPLED WITH THE ISOTROPIC RESPONSE, WAS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT, DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE. WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 20 COUNTS/SEC.

CN 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECHAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME

NURMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME - EXPLORER 42 NSSDC ID 70-107A ALTERNATE NAMES - SAS 1, SAS-A, CHURU 1, PL-701C, 04797

LAUNCH DATE- 12/12/70 SPACECRAFT WEIGHT IN CREIT- 142. KG

LAUNCH SITE- SAN MARCO PLATFORM. OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS

EPOCH DATE- 12/12/70 ORBIT TYPE- GEOCENTRIC CRBIT PERIOD- 95.7 MIN

APOAPSIS- 372.000 KM ALT FERIAPSIS- 531.000 KM ALT INCLINATION- 3.04 DEG

RECENT GREIT PARAMETERS

EPOCH DATE- 09/06/73 URBIT TYPE- GEOCENTRIC CRBIT PERIOD- 95.072 MIN

APOAPSIS- 538.14 KM ALT PERIAPSIS- 505.86 KM ALT INCLINATION- 3.036 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM = M.R. TOWNSEND NASA-GSFC GREENEELT, MD

PS = C.E. FICHTEL NASA-GSFC GREENBELT, MD

### SPACECRAFT ERIEF DESCRIPTION

EXPLORER 42 WAS THE FIRST OF A SERIES OF SMALL SPACECRAFT WHOSE UBJECTIVES WERE TO SURVEY THE CELESTIAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY, GAMMA-RAY, UV. AND OTHER SEECTFAL REGIONS. THE PRIMARY MISSION OF EXPLORER 42 WAS TO DEVELOP A CATALOG OF CELESTIAL X-RAY SOURCES BY SYSTEMATIC SCANNING OF THE CELESTIAL SPHERE IN THE ENERGY RANGE FROM 1 TO 20 KEV. THE SPACECRAFT WAS LAUNCHED DECEMBER 12, 1970 FROM THE SAN MARCO PLATFORM OFF THE COAST OF KENYA. AFRICA. IN TO A NEAR CIRCULAR EQUATORIAL DREIT. THE ORBITING SPACECRAFT WAS IN THE SHAPE OF A CYLINDER APPROXIMATELY SE CM IN DIAM AND 116 CM IN LENGTH. FOUR SOLAR PACCLES WERE USED TO RECHARGE A 6-AMP-PR EIGHT-CELL NICKEL-CADMILM BATTERY AND TO PROVIDE POWER TO THE SPACECRAFT AND EXPERIMENT. THE SPACECRAFT WAS SPIN STABILIZED. AND A MAGNETICALLY TORQUED COMMANDABLE CONTROL SYSTEM WAS USED TO POINT THE SPIN AXIS OF THE SPACECRAFT TO ANY POINT OF THE SKY. NORMAL OPERATION OF THE SPACECRAFT STARTED ON DECEMBER 18, 1970. DATA WERE STORED ON A CNE-GRBIT STORAGE TAPE RECORDER AND TELEMETERED DURING A 3.4-MIN PLAYEACK CYCLE. A 1000-BPS PCM/PM SYSTEM WAS USED. THE TAFE RECORDER FAILED ON JANUARY 23. 1971. ONLY REAL-TIME DATA FROM BACKUP GROUND STATIONS WERE AVAILABLE AFTER JANUARY 23. 1971. THE STAR SENSOR FAILED IN NOVEMBER 1971. THE SPACECRAFT BATTERY FAILED IN EARLY APRIL 1973. SINCE THAT TIME THE SPACECRAFT HAS OPERATED ON SCLAF POWER ONLY AND HAS PRODUCED TWO TO THREE USABLE FRAMES OF DATA PER DAY.

ON 01/23/71. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ALL-SKY X-RAY SURVEY

NSSDC IC 70-107A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR) PI - R. GIACCONI HARVARD COLLEGE OBS CAMBRIDGE, MA 01 - E.M. KELLOGG HARVARD COLLEGE CBS CAMERICGE, MA OI - H. GURSKY HARVARD COLLÈGE OBS CAMBRIDGE. MA 01 - H. TANANBAUM HARVARD COLLEGE CBS CAMERIDGE. MA

### EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WERE TO PERFORM AN ALL-SKY SURVEY TO DETECT AND LOCATE STELLAR X-RAY SOURCES IN THE ENERGY RANGE FROM 1- TO 20-KEV. WITH LOCATION ACCURACIES OF CNE MIN OF ARC FCR THE STRONGER SOURCES. AND TO STUDY SOURCE SPECTRA AND TEMPORAL VARIATIONS. THE INSTRUMENT HAD TWO NEARLY IDENTICAL SIDES. EACH SIDE CONSISTED OF AN X-RAY DETECTION SYSTEM COMPOSED OF A COLLIMATOR. PROPORTIONAL COUNTERS. ASSOCIATED ELECTRONICS. AND AN ASPECT SENSING SYSTEM. THE HIGH SPATIAL RESOLUTION SIDE HAD A VIEWING ANGLE OF 0.5- BY 5-DEG FULL-WIDTH HALF-MAXIMUM (FWHM). AND A DETECTION RANGE OF 1 TO 20 KEV. THE HIGH SENSITIVITY SIDE HAD A 5- BY 5-DEG FWHM COLLIMATOR AND A DETECTION RANGE OF 1 TO 10 KEV. SIX GAS-FILLED PROPORTIONAL COUNTERS WERE LOCATED BEHIND EACH COLLIMATOR. NORMAL OPERATION OF THE EXPERIMENT STARTED ON DECEMBER 18, 1970 AND CONTINUED UNTIL JANUARY 23. 1971 WHEN THE SPACECRAFT RECORDER FAILED. REAL-TIME DATA WERE COLLECTED AFTER THAT DATE. THIS PROVIDED DATA RECOVERY DURING 60 PERCENT OF EACH ORBIT. ONLY TWO OR THREE USABLE FRAMES OF DATA PER DAY WERE OBTAINED AFTER THE BATTERY FAILED IN APRIL 1973.

ON 01/23/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- APOLLO 14 LM/ALSEP NSSDC ID 71-008C ALTERNATE NAMES- ALSEP 14. LEM 14. 04905. APOLLO 14C

LAUNCH DATE- 01/31/71 SPACECRAFT WEIGHT IN ORBIT- 124.2 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY
UNITED STATES
NASA-OMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R. PETRONE NASA HEADQUARTERS WASHINGTON. DC

### SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 14 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT. AND AN APOLLO LUNAR SURFACE EXPERIMENT FACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE LUNAR HIGHLANDS (3 DEG 39 MIN 1 SEC S LATITUDE, 17 DEG 27 MIN 55 SEC W LONGITUDE). THE NUCLEAR POWERED ALSEP WAS DEPLOYED AT THE LANDING SITE, AND INCLUDED EXPERIMENTS TO

STUDY THE SEISMIC WAVES. MAGNETIC FIELDS, SOLAR WIND COMPOSITION AND INTERACTION WITH THE MOON. LUNAR ATMOSPHERE. IONIC ENVIRONMENT. HIGH-ENERGY RADIATION DAMAGE TO SOLAR CELLS. LUNAR MOTION. AND THE LUNAR SOIL.

ON 02/05/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID 71-008C-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) GALVESTON. TX U OF TEXAS LATHAM PI - G.V. NEW YORK - NY COLUMBIA U OI - W.M. EWING CAMBRIDGE . MA PRESS MIT 01 - F. HONOLULU. HI U OF HAWAII SUTTON 01 - G.

# EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP. IT WAS LOCATED AND DEPLOYED 98 M FROM THE LM. THIS EXPERIMENT WAS DESIGNED TO MEASURE SEISMIC ACTIVITY OF THE MOON AND TO OBTAIN INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE WAS ALSO DESIGNED TO DETECT SURFACE TILT PRODUCED BY TIDAL DEFORMATIONS. MOONQUAKES. AND METEORITE IMPACTS. THE EXPERIMENT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE THE SENSOR ASSEMBLY. THE LEVELING STOOL. THE THERMAL SHROUD. AND THE RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION. WHICH TRANSMITTED THE DATA BACK TO EARTH. INFORMATION ABOUT THE INTERIOR TO DEPTHS OF APPROXIMATELY 100 KM HAVE BEEN OBTAINED FROM THIS SEISMOMETER AND FROM THE APOLLO 11 MISSION SEISMOMETER LEFT ON THE MOON AT TRANQUILITY BASE.

ON 02/05/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/05/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ACTIVE SEISMIC

NSSDC ID 71-008C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=DTHER INVESTIGATOR)
PI - R.L. KOVACH STANFORD U STANFORD, CA
DI - J.S. WATKINS U OF NORTH CARCLINA CHAPEL HILL, NC

#### EXPERIMENT ERIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO GENERATE AND MONITOR SEISMIC WAVES IN THE MOON NEAR THE SURFACE IN ORDER TO STUDY THE INTERNAL STRUCTURE TO A DEPTH OF 460 M. THE SEISMIC ENERGY SCURCE USED WAS THE THUMPER DEVICE. WHICH CONTAINED 21 SMALL EXPLOSIVE CHARGES. THE MORTAR PACKAGE CONTAINING FOUR HIGH-EXPLOSIVE GRENADES WAS PLANTED. BUT IT'S DETENATION FROM EARTH WAS POSTPONED UNTIL THE OTHER EXPERIMENTS WERE COMPLETED TO AVOID DANAGING THEM. THE THUMPER DEVICE PROVIDED DATA THAT INDICATED THAT TWO P-WAVE VELOCITIES WERE MEASURED AT THE FRA MAURO SITE. THE NEAR SURFACE HAS A SEISMIC WAVE VELOCITY OF 104 M/SEC. AND A SUBLAYER STARTING AT A DEPTH OF 8.5 M HAS A VELOCITY OF 299 M/SEC. ESTIMATES OF THE THICKNESS OF THIS SUBSTRATUM RANGE FROM 38 TO 76 M, WHICH IS PROBABLY INDICATIVE OF THE DEPTH OF THE FRA MAURO

FORMATION. THE EQUIPMENT CONSISTED OF A STAFF WITH THE CHARGE INITIATORS MOUNTED ON THE LOWER END OF ITS BASE, A CABLE CONNECTING THE STAFF (THUMPER) TO THE CENTRAL STATION. GEOPHONES (MINIATURE SEISMOMETERS) FOR RECORDING THE WAVES. AND A THREE-CHANNEL AMPLIFIER WITH LOG COMPRESSOR FOR TELEMETERING THE EARTH.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/05/71. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID 71-008C-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=CTHER INVESTIGATOR)
PI - J.W. FREEMAN RICE U HOUSTON. TX

#### EXPERIMENT BRIEF DESCRIPTION

THE ALSEF SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND THE FREE-STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FROM THE DATA OBTAINED. FLUX, NUMBER DENSITY, VELOCITY, AND ENERGY PER UNIT CHARGE CAN BE DETERMINED. A CURVED PLATE ANALYZER AND AN E CROSS B VELOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM C.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV. ENABLING SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU. A SEPARATE CURVED PLATE ANALYZER COUNTED SOLAR WIND PROTONS IN SELECTED ENERGY INTERVALS FROM 10 TO 3500 EV. DUE TO THE ORIENTATION OF THESE DIRECTIONAL INSTRUMENTS. SOLAR WIND IONS WERE NOT OBSERVED DIRECTLY EXCEPT IN THE TAILWARD SHEATH. HOWEVER. IONS FROM THE BOW SHOCK WERE CESERVED. CN APRIL 5. 1971 SCME ENGINEERING DATA WAS LOST DUE TO THE PARTIAL FAILURE OF AN ANALOG-TO-DIGITAL CONVERTER. THE EXPERIMENT RETURNED GOOD CONTINUOUS SCIENTIFIC DATA UNTIL OCTOBER 20, 1971 WHEN ARCING IN THE HIGH-VOLTAGE FOWER SUPPLY LIMITED OPERATION NEAR LUNAR NOON. AFTER DECEMBER 16. 1971 OFERATION WAS DISCONTINUED WHEN INSTRUMENT TEMPERATURE EXCEEDED 85 DEG C. ALL DATA TAKEN AFTER MARCH 29, 1972 WAS TAKEN IN AN ANGKALOUS STANDBY MODE. AND CATA COVERAGE WAS VERY POOR.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

CN 03/29/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT

NSSDC ID 71-008C-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=OTHER INVESTIGATOR)
PI - F.S. JOHNSON U OF TEXAS DALLAS. TX
OI - D.E. EVANS NASA-JSC HOLSTON. TX

### EXPERIMENT BRIEF DESCRIPTION

THE ALSEP COLD CATHODE GAUGE EXPERIMENT DETERMINED PRESSURES FROM 10 TO THE -6 POWER TO 10 TO THE -12 POWER TERR OF THE AMBIENT LUNAR ATMOSPHERE. THE RESULTS OF THIS EXPERIMENT, COMBINED WITH THOSE OF THE SUPRATHERMAL ION DETECTOR. WERE USED TO MEASURE THE DENSITY AND PRESSURE OF THE LUNAR NEUTRAL

ATMOSPHERE. ON APRIL 5. 1971 SOME ENGINEERING DATA WAS LOST DUE TO THE PARTIAL FAILURE OF AN ANALOG TO DIGITAL CONVERTER. THE EXPERIMENT RETURNED GOOD CONTINUOUS SCIENTIFIC DATA UNTIL OCTOBER 20. 1971 WHEN ARCING OCCURRED IN THE HIGH-VOLTAGE POWER SUPPLY, LIMITING OPERATION NEAR LUNAR NOON. AFTER DECEMBER 20. 1971 OPERATION WAS DISCONTINUED WHEN INSTRUMENT TEMPERATURE EXCEEDED 85 DEG C. ALL DATA TAKEN AFTER MARCH 29. 1972 WAS TAKEN IN AN ANOMALOUS STANDEY MODE. WHERE DATA COVERAGE WAS VERY FOOR.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/29/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- CHARGED PARTICLE LUNAR ENVIRONMENT

NSSCC IC 71-008C-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - 8.J. O\*BRIEN DEPT OF ENVIRON PROT PERTH, AUSTRALIA

OI - D.L. REASONER RICE U HCLSTCN, TX

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM OF LOW-ENERGY CHARGED PARTICLES STRIKING THE LUNAR SURFACE. THE MAIN PART OF THE INSTRUMENTATION CONSISTED OF TWO ELECTROSTATIC ANALYZERS. CHE OF THESE POINTED TOWARD LOCAL LUNAR VERTICAL, AND THE OTHER TO A POINT 60 DEG FROM VERTICAL TOWARD LUNAR WEST. AS A FIRST APPROXIMATION. BOTH DETECTORS COULD BE CONSIDERED TO POINT IN THE ECLIPTIC PLANE. EACH ANALYZER CONSISTED OF A SET OF DIRECTION-CEFINING SLITS, DEFLECTION PLATES, FIVE SMALL-APERTURE, C-SHAPED CHANNEL ELECTRON MULTIPLIERS. AND ONE LARGER APERTURE CHANNEL ELECTRON MULTIPLIER. FOR A GIVEN APPLIED DEFLECTION VOLTAGE, THE FIVE MULTIPLIERS WERE ARRANGED SO AS TO COUNT PARTICLES OF ONE POLARITY WITH DIFFERING ENERGIES. WHILE THE LARGER APERTURE MULTIPLIER MADE A WIDE-BAND MEASUREMENT OF PARTICLES OF THE OPPOSITE POLARITY. DUFING EACH 19.2-SEC INTERVAL IN THE AUTOMATIC MODE OF EXPERIMENT OPERATION. DEFLECTION VOLTAGES OF ZERO VOLTS (TWICE) AND PLUS AND MINUS 35, 350. AND 3500 VOLTS WERE APPLIED TO THE DEFLECTION PLATES OF BOTH ANALYZERS FOR 2.4 SEC EACH VOLTAGE. THE LITTLE-USED MANUAL MODE PERMITTED THE CONTINUOUS APPLICATION OF A SINGLE DEFLECTION VOLTAGE. THUS INCREASING TEMPORAL RESOLUTION FOR PARTICLES IN A LIMITED PORTION OF THE SPECTRUM. USEFUL DATA OBTAINED DURING EACH 19.2-SEC INTERVAL (AUTOMATIC MODE) WERE, FOR EACH ANALYZER, 1.2-SEC ACCUMULATED COUNTS OF ELECTRONS IN 18 ENERGY WINDOWS BETWEEN 4C EV AND 20 KEV. AND IONS IN 12 ENERGY WINDOWS BETWEEN 0.17 AND 20 KEV. THE EXPERIMENT WORKED NORMALLY FROM DEPLOYMENT (FEB. 5, 1971) UNTIL APRIL 8, 1971 WHEN THE ANALYZER POINTING AWAY FROM LUNAR VERTICAL FAILED. THE CTHER ANALYZER CONTINUED TO FUNCTION NORMALLY UNTIL JUNE 6, 1971. WHEN A PARTIAL FAILURE OCCURRED. OPERATION OF THIS ANALYZER WAS INTERMITTENT FOR THE REST OF 1971. DURING MOST OF 1972, OPERATION WAS CONTINUOUS DURING LUNAR NIGHT AND INTERMITTENT DURING LUNAR DAY. FROM DECEMBER 1972 TO FEBRUARY 1973 OPERATION WAS CONTINUOUS AT WHICH TIME THE HIGH VOLTAGE PROBLEMS CCCURRED AGAIN.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/01/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- EXPLORER 43

NSSDC ID 71-019A

ALTERNATE NAMES -

IMP-1. IMP 6. 05C43

LAUNCH DATE- 03/13/71

SPACECRAFT WEIGHT IN DRBIT-

278. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NASA-OSSA

INITIAL URBIT PARAMETERS

EPOCH DATE- 03/17/71 ORBIT TYPE- GEOCENTRIC CRBIT FERICE- 5956. MIN APOAPSIS- 204577. KM ALT PERIAPSIS- 353.000 KM ALT INCLINATION-28 .80 DEG

RECENT ORBIT PARAMETERS

EPDCH DATE- 09/05/73 DRBIT TYPE- GEOCENTRIC GRBIT PERICD- 5974.5 MIN APOAPS IS - 195513. KM ALT PERIAPSIS- 9864.88 KM ALT INCLINATION- 37.714 DEG

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - P. 8UTLER NASA-GSEC

GREENBELT. MD

PS - F.8. MCDGNALC

NASA-GSEC

GREENEELT. MC

## SPACECRAFT BRIEF DESCRIPTION

IMP-I (EYE) CONTINUED THE STUDY, BEGUN BY EARLIEF IMPS. OF THE INTERPLANETARY AND CUTER MAGNETOSPHERIC REGIONS BY MEASURING ENERGETIC PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. A RADIC ASTRONOMY EXPERIMENT WAS ALSO INCLUDED IN THE SPACECRAFT PAYLCAD. THE 16-SICED SPACECRAFT WAS 182.12 CM HIGH BY 125.64 CM IN DIAMETER. THE SPACECRAFT SPIN AXIS WAS NORMAL TO THE ECLIPTIC PLANE. AND ITS SPIN RATE WAS 5 RPN. THE INITIAL APOGEE POINT LAY NEAR THE EARTH-SUN LINE. THE SQLAR-CELL AND CHEMICAL-BATTERY-POWERED SPACECRAFT CARRIED INC TRANSMITTERS. CHE CONTINUOUSLY TRANSMITTED PCM ENCODER DATA AT A 1600-BPS INFORMATION BIT RATE. THE SECOND TRANSMITTER WAS USED FOR TRANSMISSION OF VLF DATA AND FOR RANGING INFORMATION. THREE ORTHOGONAL PAIRS OF DIFFLE ANTENNAS WERE USED FOR THE ELECTRIC FIELDS EXPERIMENTS. AND ONE OF THESE PAIRS WAS ALSO USED FOR THE RADIO ASTRONOMY EXPERIMENT. THE MEMBERS OF THE ANTENNA PAIR ALONG THE SPACECRAFT SPIN AXIS EXTENDED 2.9 M. THE MEMBERS OF THE PAIR USED IN BOTH THE ELECTRIC FIELD AND RADIO ASTRONOMY EXPERIMENTS EXTENDED 45.5 N. AND THE MEMBERS OF THE THIRD PAIR WERE SLIGHTLY UNBALANCED, EXTENDING 24.4 AND 27.6 M. RESPECTIVELY. ALL FOUR ELEMENTS PERPENDICULAR TO THE SPIN AXIS WERE TO HAVE EXTENDED 45.5 M.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF MAGNETIC FIELDS

NSSCC IC 71-019A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, UI=OTHER INVESTIGATOR)

NESS . P1 - N.F. SEEK

NASA-GSEC

GREENBELT: MD

01 - J.B. FAIRFIELD of - D.H.

NASA-GSFC NASA-GSEC

GREENEELT. MC GREENBELT, MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE ACCURATELY THE VECTOR MAGNETIC FIELD IN THE INTERPLANETARY MEDIUM AND IN THE EARTH'S MAGNETOSPHERE. MAGNET OT ALL. AND MAGNETOSHEATH. THE DETECTOR WAS A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNET CMETER WITH FOUR RANGES -- MINUS TO PLUS 16. 48. 144. AND 432 GAMMAS. RESPECTIVELY. CORRESPONDING SENSITIVITIES BERE FLUS ER MINUS 0.06. 0.19. 0.56. AND 1.69 GAMMAS. RESPECTIVELY. ALTOMATIC RANGE SELECTION CAPABILITY WAS INCLUDED. A FLIPPING MECHANISM PERMITTED INFLIGHT CALIBRATION OF THE THREE SENSOR ZERO LEVELS. THE VECTOR SAMPLING RATE MAS 12.5 SAMPLES PER SECOND.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC FIELDS

NSSDC ID 71-019A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR , DI=CTHER INVESTIGATOR) GREENEELT. MD NASA-GSFC PI - Tale AGGSON HEPPNER GREENBELT. MD 01 - J.P. NASA-GSFC

# EXPERIMENT BRIEF DESCRIPTION

TWO DIPOLE ANTENNAS WERE MOUNTED ORTHOGONALLY IN THE SPIN PLANE OF THE SPACECRAFT WHILE A THIRD DIPOLE ANTENNA WAS MOUNTED ALONG THE SPACECRAFT SPIN AXIS. ANTENNA ELEMENT LENGTHS WERE -X. 27.6 M. +X, 24.4 M. -Y AND +Y. 45.5 M, -Z AND 4Z (SPIN AXIS), 2.9 M. ELECTROMETERS MEASURED THE ANALOG PUTENTIAL DIFFERENCE BETWEEN THE ELEMENTS IN EACH PAIR OF ANTENNAS SIMULTANEOUSLY EVERY 5.12 SEC. THE POTENTIAL DIFFERENCES WERE SAMPLED DIGITALLY THROUGH A 14-BIT ANALOG/DIGITAL CONVERTER EVERY .64 SEC. DC SENSITIVITY WAS 100 MICROVOLTS PER METER.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION FATE BECAME STANDARD.

ON 03/20/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME - ELECTROSTATIC WAVES AND RADIC NSSCC IC 71-019A-03 NOISE -- IONA

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) U OF TOWA U OF MINNESCTA ICWA CITY. IA CURNETT PI - DoA. MINNEAFELIS. MN OI - PoS. KELLOGG NASA-GSFC GREENBELT. MD DI - Tale AGGSON GREENEELT, ND NASA-GSFC GI - J.P. HEPPNER

# EXPERIMENT BRIEF DESCRIPTION

THREE URTHOGONAL SEARCH COILS AND THE THREE CRITHCGCNAL NEARLY BALANCED DIPCLES USED IN THE DC ELECTRIC FIELD EXPERIMENT (71-019A-02) GAINED SIMULTANEOUS E AND E FIELD DATA IN 16 LOGARITHMICALLY EQUISPACED NARROW CHANNELS FROM 20 HZ TO 200 KHZ. THE SPECTFAL FREQUENCY RESCLUTION WAS ABOUT 30 PERCENT. BACH E-B CHANNEL WAS SAMPLED EVERY 5.12 SEC. A SHORT BACK-UP

DIPOLE ANTENNA (ABOUT 1 M TIP TO TIP) WAS ALSO USED TO DETECT VERY SHORT WAVELENGTH PLASMA PHENOMENA. ANALOG B OR E DATA FROM 0 TO 30 KHZ IN THREE SEGMENTS WERE ALSO TELEMETERED ON THE SPECIAL PURFOSE 4-W ANALOG CHANNEL. THIS EXPERIMENT WAS DESIGNED TO BE USED IN CONJUNCTION WITH THE LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA).

ON 03/13/71. THE DATE OF THE LAST TOENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/16/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NURMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- LOW-ENERGY PROTONS AND ELECTRONS NSSDC ID 71-019A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR) PÌ ~ L·A. FRANK U OF IDWA IOWA CITY, IA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO CONCUCT COMPREHENSIVE COSERVATIONS OF THE DIFFERENTIAL ENERGY SPECTRA, THE ANGULAR DISTRIBUTION, AND SPATIAL DISTRIBUTIONS AND TEMPORAL VARIATIONS OF ELECTRONS AND PROTONS OVER THE GEOCENTRIC PADIAL DISTANCE RANGE 1.03 TC 30 EARTH RADII. TWO ARRAYS OF THE CURVED-PLATE CYLINDRICAL ELECTROSTATIC ANALYZERS AND CONTINUOUS CHANNEL MULTIPLIERS WERE USED FOR THIS PURPOSE. ENE ANALYZER, THE LEPEDEA (LOW ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER), WAS TO MEASURE THE ENERGY SPECTRA AND ANGULAR DISTRIBUTION OF PROTCAS AND ELECTRONS SEPARATELY IN THE ENERGY RANGE 24 EV TO SC KEV (16 ENERGY INTERVALS FOR FROTENS AND ELECTRONS SEPARATELY). THE CTHER ANALYZER, THE LEFCEA (LCW ENERGY PROTON DIFFERENTIAL ENERGY ANALYZER) WAS TO MEASURE THE ENERGY SPECTRA AND ANGULAR DISTRIBUTION OF PROTUNS IN THE ENERGY RANGE 1.7 TC 550 EV (EIGHT ENERGY INTERVALS). THE ANALYZERS WERE MOUNTED PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. AN EON TYPE 213 GM COUNTER, WHOSE COLLIMATED FIELD OF VIEW DF 15 DEG HALF ANGLE WAS CRIENTED APPROXIMATELY PARALLEL TO THAT OF THE LEFEDEA. WAS USED TO MEASURE THE INTENSITY OF ELECTRONS OF ENERGIES GREATER THAN 45 KEY AND PROTONS OF ENERGIES GREATER THAN 500 KEV AND TO PROVIDE BACKGROUND MEASUREMENTS FOR THE LEPEDEA.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE EECAME STANDARD.

ON 03/13/71. THE CATE OF THE LAST IDENTIFIED EXFERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION HATE BECAME STANDARD.

EXPERIMENT NAME- MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS

NSSDC ID 71-019A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) PI - K.A. ANDERSON U OF CALIFCRNIA, BERK BERKELEY, CA

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WAS USED TO STUDY THE ACCELERATION OF ELECTRONS AT THE SUN AND THEIR EJECTION INTO INTERPLANETARY SPACE. CONSISTED OF FOUR DETECTORS. TWO OF THESE WERE GM TUBES WITH VIEWING DIRECTIONS OF 170 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. DNE TUBE RESPONDED TO ELECTRONS WITH ENERGIES GREATER THAN 20 KEV THAT WERE EACKSCATTERED OFF A GOLD FOIL.

THE 20-KEV ELECTRON DATA WERE ACCUMULATED AND READ OUT EVERY 10.24 SEC. THE OTHER GM TUBE DIRECTLY CBSERVED ELECTRONS AND PROTONS WITH ENERGIES GREATER THAN 18 AND 250 KEV. RESPECTIVELY. THIS DATA WAS ACCUMULATED AND READ OUT EVERY 5.12 SEC. THE THIRD DETECTOR. A TELESCOPE CONSISTING OF THREE SEMICONDUCTURS, HAD A VIEWING DIRECTION OF 170 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. THIS DETECTUR RESPONDED TO ELECTRONS AND PROTONS IN THE ENERGY INTERVALS 18 TO 450 KEV AND 0.04 TO 2 MEV. RESPECTIVELY. ELECTRON DATA FROM THIS DETECTOR WERE ACCUMULATED IN FOUR CONTIGUOUS LOGARITHMICALLY EQUISPACED ENERGY CHANNELS FOR 5.12 SEC AND READ CUT AT THE END OF EACH TIME INTERVAL. IN ADDITION, A 64-CHANNEL PULSE HEIGHT ANALYSIS WAS PERFORMED ON THE DETECTOR COUNTS, AND THIS INFORMATION WAS TELEMETERED EVERY 163.84 SEC. PROTON DATA FROM THIS DETECTOR WAS ACCUMULATED AND REAC OUT EVERY 20.48 SEC. THE FOURTH DETECTOR CONSISTED OF TWO SENICONDUCTORS WITH A VIEWING DIRECTION PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THIS DETECTOR RESPONDED TO ELECTRONS WITH ENERGIES BETWEEN 47 AND 350 KEV THAT WERE EACKSCATTERED OFF A GOLD FOIL. COUNTS OF 47- TO 350-KEV ELECTRONS AND 80- TC 350-KEV ELECTRONS WERE ACCUMULATED IN EACH OF 16 AND FOUR EQUIANGULAR SECTORS, RESPECTIVELY, DURING SUCCESSIVE 20.48-SEC INTERVALS, AND THEY WERE FEAD OUT AT THE END OF EACH INTERVAL .

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE EECAME STANDARD.

EN 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MONITORING OF SOLAR PROTONS

NSSCC IC 71-0194-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI + C+O+ BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MD

OI - D+J+ WILLIAMS NOA-ERL BOULDER, CO

OI - D+S+ BEALL APPLIED PHYSICS LAB SILVER SPRING, MD

# EXPERIMENT BRIEF DESCRIPTION

THE SOLAR PROTON MONITORING EXPERIMENT CONSISTED OF FIVE SEPARATE DETECTORS EACH USING ONE OR MORE SOLID-STATE DETECTOR ELEMENTS. THREE DETECTORS, EACH WITH A 2 PI STER FIELD OF VIEW AND A 20.48-SEC ACCUMULATION TIME. MEASURED PROTONS WITH ENERGIES GREATER THAN 10, 30, AND 60 MEV. RESULTANT HOURLY AVERAGED FLUXES ARE BEING PUBLISHED ON A RAPID EASIS IN SOLAR-GEOPHYSICAL DATA. THE FOURTH DETECTOR MEASURED DIRECTIONAL FLUXES OF PROTONS IN THE ENERGY INTERVALS 0.2 TO 0.5, 0.5 TO 2.0, AND 2.0 TO 7.5 MEV AND DIRECTIONAL FLUXES OF ALPHA PARTICLES IN THE ENERGY INTERVAL 8 TO 20 MEV. THE FIFTH DETECTOR MEASURED DIRECTIONAL FLUXES OF ELECTRONS ABOVE 10 KEV. FOR THE LAST TWO DETECTORS, COUNTS WERE OBTAINED IN 45-DEG SECTORS AS THE SPACECRAFT SPUN. ONBOARD CALIBRATICN CAPABILITY FOR THE FIRST FOUR DETECTORS WAS INCLUDED.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE: THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/14/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR AND GALACTIC COSMIC-RAY STUDIES NSSDC ID 71-019A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=CTHER INVESTIGATOR)

PI = F.B. MCDDNALC NASA-GSFC GREENBELT, MD

OI = B.J. TEEGARCEN NASA-GSFC GREENBELT, MD

OI = D.E. HAGGE NASA-JSC HOUSTON, TX

# EXPERIMENT BRIEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT WAS DESIGNED TO MEASURE ENERGY SPECTRA. COMPOSITION. AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS. PROTONS. AND HEAVIER NUCLEI UP TO Z = 26. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF FOUR ESSENTIALLY IDENTICAL SOLID-STATE TELESCOPES. TWO WERE PERPENCICULAR AND TWO WERE PARALLEL TO THE SPACECRAFT SPIN AXIS. BECAUSE THE TELESCOPES DIFFERED IN THEIR ABSORBING THICKNESSES. SOME DISCRIMINATION BETWEEN ELECTRONS AND PROTONS WAS POSSIBLE. EACH DETECTOR RESPONDED TO PARTICLES BETWEEN ABOUT 50 KEY AND 2 MEV. A SEVEN-LEVEL INTEGRAL ANALYZER WAS INCLUDED FOR SPECTRAL INFORMATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE CEZDX VS E TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED Z = 1 TG 16 NUCLEI WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4-MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE DETAINED AS COUNTS IN THE DEZDX. BUT NOT IN THE E. SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEY AND Z = 1 TO 30 NUCLEI IN THE ENERGY RANGE 20 TC 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV. THIS INSTRUMENT ACTED AS A DEZDX VS E DETECTOR. ABOVE BO MEV, IT ACTED AS A BIDIRECTIONAL TRIPLE CE/DX VS E DETECTOR. BY USE OF A COMBINATION OF PULSE HEIGHT ANALYSIS AND GAIN SWITCHING, THE OUTPUT OF EACH SENSOR OF THE SECOND AND THIRD DETECTOR SYSTEMS WAS SURTED INTO ONE OF 1000 AND 1200 ENERGY CHANNELS. RESPECTIVELY. FLUX DIRECTIONALITY INFORMATION WAS UBTAINED BY DIVIDING CERTAIN PORTIONS OF THE CATA FROM EACH CETECTOR INTO EIGHT ANGULAR SECTORS. THE SECOND DETECTOR SYSTEM PERFORMED NORMALLY FROM LAUNCH UNTIL OCTOBER 14, 1971 (APCGEE SHADOW), AFTER WHICH PROBLEMS WERE ENCOUNTERED. ESSENTIALLY NO DATA WERE OBTAINED FROM THIS TELESCOPE AFTER NOVEMBER 1971.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQLISITION RATE BECAME STANDARD.

ON 10/14/71, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NUCLEAR COMPOSITION OF COSMIC AND SGLAR NSSCC ID 71-0194-09
PARTICLE RADIATIONS

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR. DIECTHER INVESTIGATOR) PI - J.A. SIMPSON U OF CHICAGO CHICAGE, IL CI - M.G. MUNDZ U OF CHICAGO CHICAGO, IL 0I - S. U OF CHICAGO CHICAGO, IL 01, - J. HSIEH U OF CHICAGO CHICAGO, IL 01 - G.M. MAS ON U OF CHICAGO CHICAGO, IL

# EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRA OF NUCLEI OVER A WIDE DYNAMIC RANGE OF FLUXES (AT LEAST 100,000). EMPHASIS HAS BEEN PLACED ON HIGH CHARGE RESOLUTION EXTENDING FROM Z=1 TO  $Z\simeq 30$ , and high isotopic resolution for H, He, and Li. The experiment is also designed to measure electrons of energies greater than 2 NeV. The instrumentation

INCLUDED TWO PARTICLE TELESCOPES (A COMPOSITION TELESCOPE WAS COMPOSED OF FOUR SOLID-STATE DETECTORS AND A CERENKOV COUNTER, AND THE LOW-ENERGY TELESCOPE WAS COMPOSED OF FIVE SOLID-STATE AND TWO SCINTILLATION DETECTORS). BOTH TELES COPES WERE TO BE CALIBRATED PERIODICALLY IN FLIGHT BY PROGRAMMED PULSE GENERATORS. THE OUTPUTS OF SENSORS D1. D4 AND THE CERENKOV COUNTER OF THE COMPOSITION TELESCOPE WERE PULSE HEIGHT ANALYZED BY THREE 512-CHANNEL PULSE HEIGHT ANALYZERS. AND THE OUTPUT OF D2 WAS ANALYZED BY A 1024-CHANNEL PULSE HEIGHT ANALYZER. USE OF THE VARIOUS COUNT RATE MODES PROVIDED A DIFFERENTIAL ENERGY SPECTRUM (THREE INTERVALS) OF NUCLEI UP TO ABOUT Z = 30 IN THE ENERGY RANGE FROM 0.5 TO 1200 MEY/NUCLEON. THE CERENKOV COUNTER ALLOWED MEASUREMENT OF NUCLEI FROM 1.2 TO ABOUT 2 BEV/NUCLEON BEFORE SATURATING. SIMILARLY. THE OUTPUTS OF SENSORS D1. D2. AND D5 OF THE LOW-ENERGY TELESCOPE WERE PULSE HEIGHT ANALYZED USING TWO 256-CHANNEL ANALYZERS. SENSORS D1 AND D5 SHARED DNE ANALYZER. I.E., WHEN AN EVENT HAD SUFFICIENT ENERGY TO TRIGGER D5. THE ANALYZER WAS AUTOMATICALLY SWITCHED FROM D1 TO D5. THE DIFFERENTIAL ENERGY SPECTRUM (TWC INTERVALS) OF NUCLEI UP TO ABOUT Z = 30 WAS OBTAINABLE FROM ABOUT 0.5 TO ABOUT 800 MEY/NUCLEON. THE ELECTRON CURRENT DETECTOR (ECO) AND THE FISSION CELL CARRIED OUT MEASUREMENTS IN THE EARTH'S RADIATION BELTS. THE ECD DETECTED EXTREMELY HIGH INTENSITIES (GREATER THAN 1.000.000 PARTICLES/CM SG-SEC) OF ELECTRONS OF ENERGIES GREATER THAN 2 MEY BY MEASURING THE CURRENT GENERATED IN A SOLID-STATE DETECTOR BY THE IGNIZATION LOSS OF LARGE NUMBERS OF ELECTRONS. THE FISSION CELL WAS DESIGNED TO DETECT PROTON FLUXES (ENERGIES GREATER THAN 50 MEV) BY SANDWICHING A THIN FOIL OF THESE BETWEEN THE SCLIC-STATE DETECTORS WHICH RESPONDED ONLY TO LARGE PLLSES LEFT BY SLCW MOVING FRAGMENTS FROM PROTON INDUCED FISSION OF THE THORIUM. THE COMPOSITION TELESCOPE FAILED WITHIN A DAY AFTER LAUNCH DURING THE PRE-SPINUP FERICO OF THE SFACECRAFT. APPARENTLY DUE TO CONTINUOUS DIRECT EXPOSURE TO THE SUN. THE D6 DETECTOR OF THE LOW-ENERGY TELESCOPE WAS NOISY IN AUGUST: 1971.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID 71-019A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 0 I=OTHER INVESTIGATOR) LOS ALAMOS. NM LOS ALAMOS SCI LAB BAME PI - S.J. LOS ALAMOS. NM LOS ALAMOS SCI LAB ASBRIDGE 01 - J.R.

# EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WAS USED TO EXTEND DESCRIPTIONS OF THE PARTICLE (ELECTRON AND POSITIVE ICN) POPULATIONS IN THE SQLAR WIND: MAGNETOSHEATH, AND MAGNETOTALL. ENERGY SPECTRAL ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLCWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. THE ANALYZER HAD FOUR COMMANDABLE MODES. THE FIRST MODE WAS DESIGNED FOR THE MEASUREMENT OF SCLAR WIND PROTONS AND ALPHA PARTICLES. DURING EIGHT SPACECRAFT REVOLUTIONS. 32-LEVEL ENERGY SPECTRA WERE OBTAINED IN EIGHT ANGULAR RANGES CENTERED ON THE SUN. THE ENERGY LEVELS EXTENDED FROM 100 EV TO 8 KEV. THE SECOND MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND HEAVY IONS. THIS CYCLE WAS THE SAME AS THE FIRST EXCEPT THAT THE ENERGY PER CHARGE LEVELS WERE LINITED TO 500 V TO B KV. AND THE EFFICIENCY OF COUNTING HEAVY IONS WAS INCREASED RELATIVE TO PROTONS AND ALPHA PARTICLES. THE THIRD MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND MAGNETOSHEATH FOSTILVE ICNS. THIS WAS A COMBINATION CYCLE IN WHICH ELECTRON AND POSITIVE ION SPECTRAL SWEEPS WERE ALTERNATED. DURING A CYCLE OF NINE SPACECRAFT REVOLUTIONS, EIGHT ELECTRON SPECTRA AND EIGHT POSITIVE ION SPECTRA WERE OBTAINED. THE COMBINED DATA FOR ELECTRONS IN THIS MODE CONSISTED OF 16-LEVEL ENERGY SPECTRA TAKEN IN 32 EVENLY SPACED ANGULAR RANGES. THE SPECTRA EXTENDED FROM 4 TO 1000 EV. THE DATA FOR POSITIVE IONS CONSISTED OF 32-LEVEL SPECTRA TAKEN IN THE SAME 32 ANGULAR RANGES. THE ENERGY PER CHARGE SPECTRA EXTENDED FROM 100 V TO 8 KV. THE FOURTH MODE WAS DESIGNED FOR MAGNETOTAIL ELECTRONS AND POSITIVE IONS. ELECTRONS AND POSITIVE IONS. SPACED ANGULAR RANGES FOR BOTH ELECTRONS AND POSITIVE IONS. THE ENERGY PER CHARGE RANGES WERE 6 V TO 24 KV FOR ELECTRONS AND 45 V TO 34 KV FOR POSITIVE IONS.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/15/71. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE

NSSDC ID 71-019A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - P.S. KELLDGG U OF MINNESGTA MINNEAPCLIS, MN 01 - D.A. **GURNETT** U OF IOWA IOWA CITY, IA OI - T.L. A GG5 ON NASA-GSFC GREENBELT, MD OI - J.P. HEPPNER NASA-GSEC GREENBELT. MD

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO CETERMINE THE FOLARIZATION. DIRECTION OF PROPAGATION, POINTING FLUX, AND DIRECTION OF THE WAVE NOR MAL SURFACE FOR PLASMA WAVES. THE TIME-AVERAGED CORRELATION AT ONE CHANNEL FREQUENCY FROM ANY COMBINATION OF THE SIX ANTENNA ELEMENTS (THREE EACH ORTHOGONAL E AND B) COULD BE SIMULTANEOUSLY CALCULATED BY SIX CNBOARD ANALOG COMPUTERS. THERE WERE 64 LOGARITHMICALLY EQUISPACED FREQUENCY CHANNELS CENTERED FROM 23 HZ TO 200 KHZ WITH A 15 PERCENT BANDWIDTH AT 3 DB. AVERAGING TIME WAS 2.5 SEC AT THE HIGH BIT RATE. THE COMBINATIONS OF ELEMENTS AND THE SEQUENCE OF FREQUENCIES TO BE MEASURED WERE CONTROLLED EITHER BY AN CNBCARD COMPUTER OR FROM THE GROUND.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INTERPLANETARY LONG-WAVELENGTH RADIO NSSDC 10 71-019A-13
ASTRONOMY EXPERIMENT

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.T. HADCOCK U OF MICHIGAN ANN ARBCR. MI

OI - W.C. ERICKSON U OF MARYLAND COLLEGE PARK, MD

OI - R.G. STONE NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO STUDY THE SPECTRA OF THE GALAXY. THE SUN. AND JUPITER WITH HIGH FLUX RESOLUTION (ABOUT & PERCENT). A RADIOMETER, OPERATING IN EITHER A STEPPING MODE (EIGHT FREQUENCIES) OR AT A SINGLE FREQUENCY. WAS CONNECTED TO A ECC-FT DIPOLE ANTENNA. WHICH WAS ALSO USED IN THE ELECTRIC FIELD EXPERIMENTS. THE FREQUENCY RANGE COVERED WAS 0.05 TO 3.5 MHZ.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE

NSSDC ID 71-019A-16

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) IOWA CITY. IA U OF IOWA GURNETT PI - D.A. GREENBELT. ND NASA-GSFC AGGSON OI - T.L. GREENBELT. MD NASA-GSFC 01 - J.P. HEPPNER MINNEAPOLIS, MN U OF MINNESOTA KELLOGG 01 - P.S.

# EXPERIMENT BRIEF DESCRIPTION

AC ELECTRIC FIELD INTENSITY IN 12 NARROW CHANNELS WAS MEASURED FROM 0.1 TO 100 HZ. THE EXPERIMENT HAD AN OPTIMUM NOISE THRESHOLD CF 10 MICROVOLTS PER METER. EACH CHANNEL WAS SAMPLED CICE EVERY 5.12 SEC AT THE HIGH BIT RATE. THE ANTENNAS USED IN THE DC FIELD EXPERIMENT (71-0194-02) WERE ALSO UTILIZED IN THIS EXPERIMENT.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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NSSDC ID 71-024A SPACECRAFT COMMON NAME- ISIS 2 ISIS-B. PL-701F. 05104 ALTERNATE NAMES-

248.6 KG SPACECRAFT WEIGHT IN ORBIT-LAUNCH DATE- 04/01/71

LAUNCH VEHICLE- DELTA LAUNCH SITE- VANDENBERG AFB. UNITED STATES

FUNDING AGENCY CRC CANADA NASA-OSS UNITED STATES

INITIAL CREIT PARAMETERS CEBIT PERIOD- 113-61 MIN EPOCH DATE- 04/01/71 GRBIT TYPE- GEOCENTRIC PERIAPSIS- 1367. KM ALT INCLINATION- 88.1564 DEG 1429. KM ALT APOAPSIS-

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 113.55 MIN
APOAPSIS- 1424.39 KM ALT PERIAPSIS- 1354.33 KM ALT INCLINATION- 88.181 DEG

SPACECRAFT PERSONNEL (PM=PRGJECT MANAGER, FS=PRGJECT SCIENTIST)

PM - J.E. JACKSON NASA-GSFC GREENELT, MD

PS - J.E. JACKSON NASA-GSFC GREENBELT, MD

PS - J.E. JACKSON NASA-GSFC GREENBELT, MD
PS - J.H. WHITTEKER COMM RESEARCH CENTRE OTTAWA, ONTARIO, CANADA

### SPACECRAFT ERIEF DESCRIPTION

ISIS 2 WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH A SWEEP FREQUENCY AND A FIXED FREQUENCY IDNOSONDE. A VLF RECEIVER. ENERGETIC AND SOFT PARTICLE DETECTORS. AN ION MASS SPECTROMETER, AN ELECTROSTATIC PROBE. A RETARDING POTENTIAL ANALYZER, A BEACON TRANSMITTER, A COSMIC NOISE EXPERIMENT. AND TWO PHOTOMETERS. THE SOUNDER USED TWO LONG CROSSEC-DIPOLE ANTENNAS (78.9 M AND 20.2 M LONG, RESPECTIVELY) FOR THE SCUNDING, VLF. AND COSMIC NOISE EXFERIMENTS. THE SPACECRAFT WAS NOMINALLY SPIN STABILIZED WITH SPIN AXIS IN THE ORBIT PLANE, TO ABOUT 2 RPM AFTER ANTENNA DEPLOYMENT. A CARTWHEEL MODE WITH THE AXIS PERPENDICULAR TO THE CREIT PLANE WAS MADE AVAILABLE OCCASIONALLY FOR PERIODS OF A FEW MONTHS. IN CROEF TO PROVIDE RAM AND WAKE DATA, FOR SOME EXPERIMENTS, EACH SPIN PERIOD RATHER THAN EACH ORBIT PERIOD. ATTITUDE AND SPIN INFORMATION WAS OBTAINED FROM A THREE-AXIS MAGNETUMETER AND A SUN SENSOR. CONTROL OF ATTITUDE AND SPIN WAS POSSIBLE BY MEANS OF MAGNETIC TORQUING. THE EXPERIMENT PACKAGE ALSO INCLUDED A PROGRAMMABLE TAPE RECORDER WITH A 1-HR CAPACITY. FOR NON-RECORDED OBSERVATIONS. DATA FROM SATELLITE AND SUBSATELLITE LOCATIONS WERE TELEMETERED WHEN THE SPACECRAFT WAS IN LINE OF SIGHT OF A TELEMETRY STATION. TELEMETRY STATIONS ARE LUCATED SO THAT PRIMARY DATA COVERAGE IS NEAR THE 80-DEG W MERIDIAN AND NEAR FAWAII, SINGAPORE, AUSTRALIA, ENGLAND, FRANCE. NORWAY. INCIA, JAPAN. ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. INITIAL OPERATION OF ALL EXPERIMENTS WAS NOMINAL. THE TAPE RECORDERS FAILED ON FEBRUARY 4. 1972 BUT REAL-TIME OBSERVATIONS WERE ROUTINELY TELEMETERED TO GROUND STATIONS.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER

NSSDC ID 71-024A-01

EXF	ER	IMENT :	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR. CI=CT)	HER INVESTIGATOR)
19	-	J.H.	WHITTEKER	COMM RESEARCH CENTRE	GTTAWA, ONTARIO, CANADA
O I		G.E.K.	LOCKWOOD	COMM RESEARCH CENTRE	CTTAWA ONTARIO CANADA
OΙ	-	G.L.	NELMS	COMM RESEARCH CENTRE	CTTAWA. CHTARIC. CANADA
10	~	J.	TURNER	DEPARTMENT OF INTERICR	SYDNEY, AUSTRALIA
OI	-	M.	SYLVAIN		ST NAUR, FRANCE
O1	-	<b>a.</b>	HOLT		TREMSE. NERWAY
OI	-	Υ.	UGATA	and and a	TUKYU. JAPAN
10	-	R.	RAGHAVARAO		

# EXPERIMENT ERIEF DESCRIPTION

THE ISIS 2 IGNOSONDE WAS A RADIO TRANSMITTER THAT RECERCED THE TIME DELAY BETWEEN A TRANSMITTED AND RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES EETWEEN .1 AND 20 MHZ WERE SAMPLED EVERY 14 OR 21 SEC. AND UNE OF SIX SELECTED FREQUENCIES WAS ALSO USED FOR SOUNDING FOR A FEW SECONDS DURING EACH 14- OR 21-SEC PERIOD. IN ADDITION TO THE SWEEP- AND FIXED-FREQUENCY MODES OF OPERATION, A MIXED MODE WAS AVAILABLE IN WHICH THE TRANSMITTER FREQUENCY WAS FIXED AT ONE OF SIX POSSIBLE FREQUENCIES WHILE THE RECEIVER SWEPT. SEVERAL VIRTUAL RANGE (DELAY TIME) TRACES RESULTING FROM

GROUND REFLECTIONS. PLASMA RESONANCES. BIREFRINGENCE OF THE ICNOSPHERE.
NON-VERTICAL PROPAGATION. ETC.. WERE NORMALLY OBSERVED. VIRTUAL RANGE AT A
GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE
SIGNAL. ELECTRON CENSITY ALONG THE PROPAGATION PATH. AND NODE OF
PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM (GRAPH) SHOWING VIRTUAL
RANGE AS A FUNCTION OF RADIO FREQUENCY. TWO OTHER FORMS OF DATA WERE
COMMONLY PREPARED FROM THE IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR
VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND
COMPUTATIONS OF ELECTRON DENSITY PROFILES. INITIAL OPERATION OF THIS
EXPERIMENT WAS NORMAL AND BOTH REAL TIME AND TAPE RECORDED DATA WERE TAKEN
UNTIL FEBRUARY 4. 1972 WHEN THE RECORDERS FAILED.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- FIXED FREQUENCY SOUNDER

NSSDC 10 71-024A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR) **HCULDER** CO NOAA CALVERT -W - 19 POULDER. CO. NOAA NORTON 01 - R.B. COMM RESEARCH CENTRE OTTAWA, ONTARIE, CANADA CI - G.L. NELMS OTTAWA, CHTARIC. CANADA COMM RESEARCH CENTRE PETRIE 01 - C.E. OTTAWA: ONTARIO: CANADA CUMM RESEARCH CENTRE OI - G.E.K. LOCKWOOD CTTABA. ONTARIC. CANADA COMM RESEARCH CENTRE WHITTEKER D1 - J.F. BOULDER, CO NOAA 01 - S.M. WARNOCK

# EXPERIMENT BRIEF DESCRIPTION

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 8 SEC DURING THE FREQUENCY FLY-BACK FERIOD OF THE SWEEP FREQUENCY CPERATION WHICH WAS EVERY 14 OR 21 SEC. ONE OF SIX FREQUENCIES (0.12, 0.48, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER, AS DESIRED. OTHER MICES OF OPERATION WERE AVAILABLE INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY AND A SPECIAL MIXED MODE WITH TRANSMISSION AT A SELECTED ONE OF THE SIX FIXED FREQUENCIES AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY ICROSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER, AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF PROPAGATION TIME OF THE REFLECTED PULSE) AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED CURING THE FIRST YEAR AFTER LAUNCH.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- VLF RECEIVER

NSSCC 10 71-024A-03



EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR) PI =  $R \cdot E \cdot E$  BARRINGTON COMM RESEARCH CENTRE DITAWA, ONTARIO. CANADA

#### EXPERIMENT ERIEF DESCRIPTION

THE VERY LCW-FREQUENCY (VLF) EXPERIMENT WAS A LOW-FREQUENCY (LF) BR GADBAND RECEIVER THAT OBSERVED SIGNALS FROM THE 79-M LONG DIPOLE (SPLIT MONGPOLE) ANTENNA BETWEEN .05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING SIGNALS BELOW E MHZ ON THE ICNOSONDE. THE VLF RECEIVER HAD A WIDE DYNAMIC RANGE THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL (AGC) SYSTEM. THIS VLF EXPERIMENT INCLUDED AN ONBOARD EXCITER THAT SWEPT AT A NONLINEAR RATE FROM 50 TO ZERO HZ. THEN TO 9500 HZ. CVER A FERIOD OF 1.0 SEC. THIS PERMITTED THE CONTROLLED STUDY OF IGN RESCNANCES STIMULATED BY THE EXCITER, IN ADDITION TO STUDY OF NATURAL AND CTHEM MAN-MADE VLF RADIC NOISE. THE EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.08-MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON CHE OF THE FOUR TAPE RECORDER CHANNELS FOR THE FIRST YR WHEN THE SPACECRAFT TAPE RECORDER WAS OPERATING. TAPE RECORDED (AND BACKUP REAL-TIME CAFABILITY) DATA WERE TRANSMITTED ON 4CO-MHZ TELEMETRY.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

CN 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

NSSCC IC 71-024A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=CTHER INVESTIGATOR)
PI - I.B. MCDIARMID NATIONAL RSCH COUNCIL DITAWA: ONTARIO: CANADA
OI - J.R. BURPOWS NATIONAL RSCH COUNCIL DITAWA: UNTARIO: CANADA

# EXPERIMENT BRIEF DESCRIPTION

THIS. EXPERIMENT CONSISTED OF FOUR SETS OF DETECTORS. THE FIRST, MADE UP OF FOUR GEIGER COUNTERS, MEASURED ELECTRONS GREATER THAN 20 AND 40 KEV AND PROTONS GREATER THAN 300 AND 500 KEV FARALLEL TO AND PERPENDICULAR TO THE SATELLITE SPIN AXIS. ALL REMAINING DETECTORS MEASURED PARTICLES PERPENDICULAR TO THE SPIN AXIS. THE SECOND SET CONSISTED OF TWO SOLID-STATE SILICON JUNCTION DETECTORS. THESE HAD THRESHOLDS OF 80, 100, 120. AND 200 KEV FOR ELECTRONS AND 200 AND 400 KEV FOR PROTONS. THE THIRD SET CONSISTED OF FOUR SILICON JUNCTION DETECTORS WHICH MEASURED FROTONS IN THE ENERGY RANGE 0.15 TO 55 MEV. THE FOURTH SET WAS COMPOSED OF TWO CESIUM IDDIDE SCINTILLATION-PHOTOMULTIPLIER SYSTEMS. EACH OPERATED IN TWO DIFFERENT MODES. THE SYSTEM RESPONDED TO ELECTRONS GREATER THAN 3, 40, AND 60 KEV AND PROTONS GREATER THAN 20 AND 50 KEV.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 03/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOFT-PARTICLE SPECTROMETER

NSSDC ID 71-024A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR)
PI - W.J. HEIKKILA U DF TEXAS DALLAS, TX

#### EXPERIMENT BRIEF DESCRIPTION

THE SUFT PARTICLE SPECTROMETER (WHICH WAS BASICALLY AN ELECTROSTATIC ANALYZER) WAS USED TO STUDY THE DIRECTIONAL INTENSITY AND DIFFERENTIAL ENERGY SPECTRA OF PROTONS AND ELECTRONS TO OBTAIN A GREATER UNDERSTANDING OF AURURAS. GEOMAGNETIC DISTURBANCES. AND VARIOUS IDNOSPHERIC FEATURES. DIFFERENTIAL ENERGY SPECTRA WERE DETAINED IN THE ENERGY FANGE 10 EV TO 10 KEV WITH A 20 PERCENT ENERGY RESOLUTION. THE VOLTAGE SWEEP PROGRAM OF THE ANALYZER WAS FLEXIBLE.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 03/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ION MASS SPECTROMETER

NSSDC ID 71-024A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CT+EF INVESTIGATOR)
PI - J.H. HUFFMAN U UF TEXAS DALLAS, TX

#### EXPERIMENT ERIEF CESCRIPTION

THIS MAGNETIC ION MASS SPECTROMETER EXPERIMENT WAS FLOWN TO MEASURE THE DISTRIBUTION OF THE CONCENTRATIONS OF THE ICH SPECIES AS A FUNCTION OF TIME AND POSITION. WITH PARTICULAR INTEREST FOCUSED ON THE SCLAR WIND PARTICLES. THE INSTRUMENT HAD TWO ION DETECTOR SYSTEMS, AND MASS SCANNING THROUGH THE RANGE FROM 1 TO 64 AML WAS ACCOMPLISHED IN TWO SECTIONS -- 1 TO 8 AMU AND 8 TO 64 AMU. TWO IDN BEAMS EMERGED FROM THE MAGNETIC SECTOR OF THE INSTRUMENT AND WERE SIMULTANEOUSLY DETECTED BY ELECTRON MULTIPLIERS AND LOG ELECTROMETER ANGLIFIERS. A CIRCUIT FOLLOWING EACH ANGLIFIER DETECTED THE PEAK AMPLITUDE OF THE ION CURRENT. THIS PEAK VALUE. RATHER THAN THE ENTIRE MASS SPECTRUM, WAS TRANSMITTED IN ORDER TO REDUCE THE REQUIRED TELEMETRY BANDWIDTH. IN THIS MODE OF OPERATION, THE COMPLETE MASS RANGE WAS SCANNED IN 1 SEC. A BACKUP MODE WAS PROVIDED WHICH PRODUCED AN ANALOG DUTPUT WITH A SWEEP PERIOD OF 8 SEC. THIS EXPERIMENT OPERATED NOMINALLY AFTER LAUNCH WITH MOST OF THE DATA UBTAINED IN THE PEAK MODE. FOR ABOUT 2 MIN PER PASS OVER OTTAWA, CANADA, THE EXPERIMENT OPERATED IN THE ANALOG MODE. INFLIGHT CALIBRATION WAS ACHIEVED BY COMPARING ION CONCENTRATION MEASUREMENTS AT APPROPRIATE ALTITUCES. I.E., WHERE A SINGLE ION SPECIES PRECOMINATED, WITH ELECTRON DATA FROM THE SOUNDER ON BOARD. OTHER COMPARISONS WERE MADE BETWEEN THE SPECTROMETER OUTPUT AND MEASUREMENTS CHIAINED FROM OTHER RELATED EXPERIMENTS ON ECARC.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73. THE DATE OF THE LAST ICENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NURMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME - CYLINDRICAL ELECTROSTATIC PROBE

NSSCC IC 71-024A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR)
PI = L.H. BRACE NASA-GSFC GREENBELT. MD
DI = J.A. FINDLAY NASA-GSFC GREENBELT. MC

### EXPERIMENT ERIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACEORAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND TO STUDY CHARACTERISTICS OF THS SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT DESERVED CURRENT FLOW TO THE PROBE FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS CURRENT-VOLTAGE PROFILE. ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 46.3 CM FRCM THE SC. ALCNG THE SPIN AXIS. AND WAS CENTERED BETWEEN THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNPERTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG. WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE. WHICH WERE FREE OF SC WAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC. ELECTRICALLY ISOLATED. STAINLESS STEEL TUBES. THE GUTER (0.24 CM IN DIAM AND 23 CM LENG) TUBE FUDATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 2.3 CM DUTWARD FROM THE GUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS GETAINED THAT CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1.500,000 ELECTRONS PER CM SQ. AND IN TEMPERATURE VALUES FROM 400 TO 50.000 DEG K.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER

NSSDC ID 71-024A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR) PI - E.J.R. MAIER NASA-GSEC GREENEELT, MC. SMIDDY 01 - E.J. AFCRL GREENEELT. NO TRCY. JR. 01 - B.E. NA SA-GSEC GREENPELT. MD 01 - J.L. DONLEY. NASA-GSFC GREENBELT. MD

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED ION AND/OR ELECTRON CURRENT IN ORDER TO STUDY HEAT TRANSFER PROCESSES WHICH ARE IMPORTANT IN THE DYNAMICS OF THE LONDSPHERE. THIS RETARDING POTENTIAL ANALYZER CONSISTED OF THREE GRIDS (APERTURE GRID, RETARDING GRID AND A SUPPRESSOR GRID) WHICH PROVIDED A VULT-AMPERE CURVE RELATING SWEEP VOLTAGE ON THE RETARDING GRID TO CURRENT FLOW TO THE COLLECTOR. ANALYSIS OF THE CURVES COULD PROVIDE ION/ELECTRON TEMPERATURES AND DENSITIES.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANGARD.

ON 02/04/73, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RACIO BEACON

NSSDC ID 71-024A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, 01=CTHER INVESTIGATOR) WESTERN ONTARIO U LONDON. CHTARIC. CANADA FORSYTH PI - P. A. LONDON: ONTARIO, CANADA WESTERN ONTARIO U 01 - C. LYON

EXPERIMENT ERIEF DESCRIPTION

A CW TRANSMITTER (137 TO 138 MHZ BAND) RADIATING ABOUT 100 MW AND UPERATING IN CONJUNCTION WITH TRACKING BEACON (136 TO 137 MHZ BAND) PROVIDED FACILITIES FOR DESERVING SCINTILLATIONS FROM IRREGULARITIES. DETERMINING MAGNITUDES AND POSITIONS. AND EVALUATING ELECTRON CONTENT BETWEEN GROUND OBSERVER AND SATELLITE. INTERFERENCE DIFFICULTIES WITH OTHER SPACECRAFT OPERATIONS PREVENTED NOMINAL ELECTRON CONTENT DATA FROM BEING OBTAINED. HOWEVER SOME LIMITED AMOUNT OF USEFUL SCINTILLATION DATA WAS OBSERVED.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/23/71. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC RADIO NOISE

NSSDC IC 71-024A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) COMM RESEARCH CENTRE OTTAWA: ONTARIO: CANADA HARTZ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED THE SWEEP FREQUENCY IONOSONDE RECEIVER AUTOMATIC GAIN CONTROL (AGC) VOLTAGES TO MEASURE GALACTIC AND SCLAR RADIO NCISE LEVELS. THE RECEIVER SWEPT FROM 0.1 TO 20 MHZ. THE DYNAMIC RANGE WAS 50 DB. AND THE BANDWICT+ WAS 55 KHZ. THE ANTENNAS USED WERE 20.2-M AND 78.9-M DIPCLES.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- 3914- TO 5577-A PHOTOMETER

NSSDC IC 71-024A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHEF INVESTIGATOR) EDMONTON. ALEERTA, CANADA U DF CALGARY PI - C.D. ANGER

# EXPERIMENT ERIEF CESCRIPTION

THIS DUAL WAVELENGTH SCANNING AURCRAL PHOTOMETER WAS DESIGNED TO MAP THE DISTRIBUTION OF AURCRAL EMISSIONS AT 5577 AND 3914 A OVER THE PORTION OF THE DARK EARTH VISIBLE TO THE SPACECRAFT. A COMBINATION OF INTERNAL ELECTRONIC SCANNING PERFORMED BY AN IMAGE DISSECTOR AND OF THE NATURAL ORBITAL AND ROTATIONAL MOTIONS OF THE SPACECRAFT PERMITTED THE SENSOR TO SYSTEMATICALLY SCAN ACRESS THE EARTH. THE DETECTOR SYSTEM WAS CONSTRUCTED TO ALLOW INCIDENT RADIATION TO BE ACCEPTED FROM TWO DIRECTIONS 180 DEG APART AND THEN TO FOCUS THIS LIGHT AT A COMMON FOINT ON THE SINGLE IMAGE DISSECTOR PHOTOMETER TUEE. FOR EACH DIRECTION. THE LIGHT PASSED THROUGH ITS OWN LENS. INTERFERENCE FILTER, AND MIRROR. ONE FILTER OPERATED IN THE FANGE 5581 PLUS OR MINUS 9 A (AT THE HALF-MAXIMUM POINTS). AND THE CTHER FILTER OPERATED AT 3915 PLUS OR MINUS 13 A. ONLY ONE OF THE TWO OPTICAL SYSTEMS POINTED AT THE EARTH AT ANY DNE TIME. WHILE THE DTHER FACED INTO SFACE. WHEN THE SFACECRAFT SPIN AXIS WAS ORIENTED TO LIE IN THE ORBITAL PLANE, EACH ROTATION OF THE SPACECRAFT RESULTED IN AN EARTH SCAN 5 DEG WIDE. THIS WIDTH SIZE WAS CHOSEN TO INSURE OVERLAP WITH THE PREVIOUS SCAN. THE IMAGE DISSECTOR REPETITIVELY SCANNED AT A HIGH SPEED ACROSS THE NARROW DIMENSION OF EACH 5-DEG BAND AND DIVIDED IT INTO SEPARATELY RESOLVED REGICNS 0.4 DEG BY 0.4 DEG. SINILAR STRIPS WERE SCANNED AT EACH OF THE TWO WAVELENGTHS, BUT AT TIMES THAT DIFFERED BY HALF THE ROTATION PERIOD OF ABOUT 10 SEC. A CALIBRATION LIGHT SOURCE FOR EACH WAVELENGTH WAS BUILT INTO THE OPTICAL ASSEMBLY. AND A CALIBRATE CYCLE WAS INITIATED AUTOMATICALLY WHENEVER A POWER ON COMMAND WAS GIVEN. TO MINIMIZE THE PROBLEMS ARISING FROM SOLAR ILLUMINATION OF THE OPTICS AND THE DIRECT VIEWING OF THE SUNLIT EARTH. A SUNLIGHT PROTECTION SYSTEM WAS INCLUDED. THE ELECTRONIC PORTION OF THE INSTRUMENT CONSISTED OF MODULES THAT AMPLIFIED AND COUNTED DUTPUT PULSES FROM THE IMAGE DISSECTOR TUBE AND CONVERTED THESE INTO A HIGH-RATE PULSE CODE MODULATED OUTPUT AND A LOW-RATE ANALOG CUTPUT. THE DATA WILL BE REPRODUCED DIRECTLY IN THE FORM OF SEPARATE PICTURES REPRESENTING EMISSIONS AT EACH WAVELENGTH. WHICH WILL BE USED TO STUDY THE LARGE-SCALE DISTRIBUTION AND MORPHOLOGY OF AURORAS AND TO COMPARE WITH OTHER MEASUREMENTS FROM THIS AND OTHER SPACECRAFT AND FROM GROUND-BASED INSTRUMENTS. COMPLETE DETAILS ABOUT THE EXPERIMENT CAN BE FOUND IN THE REPORT \*THE ISIS-2 SCANNING AURORAL PHOTOMETER.\* C. D. ANGER. T. FANCOTT: J. MCNALLY: AND H. S. KERR. APPLIED OPTICS: VOL 12. NO. 8. PP. 1753-1766. AUGUST (1973).

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- 6300-A PHOTOMETER

NSSCC ID 71-024A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, UI=CTHER INVESTIGATOR)
PI - G.G. SHEPHERD YORK U TORONTO, ONTARIO, CANADA

# EXPERIMENT BRIEF DESCRIPTION

A TWO-CHANNEL PHOTOMETER WAS USED TO MEASURE DIRECTLY AND TO MAP THE INTENSITY OF THE ATOMIC DXYGEN RED LINE AT 63CC A IN DAY, TWILIGHT, AND NIGHT AIRGLOW AND AURORA. EACH CHANNEL HAD ITS OWN OPTICAL INPUT. AND THE TWO INPUTS WERE MOUNTED AT THE SAME END OF THE SPACECRAFT. SEPARATED BY 180 DEG. WITH THEIR AXES AT 90 DEG TO THE SPACECRAFT'S SPIN AXIS. ONE OPTICAL INPUT WAS CHARACTERIZED BY A SPECTRAL BANDWIDTH OF 12 A CENTERED AROUND THE 6300 A LINE OF ATOMIC DXYGEN. AND THE OTHER INPUT WAS USED FOR WHITE LIGHT MEASUREMENTS. THE SPINNING SATELLITE CAUSED THE PHOTOMETER TO ALTERNATELY

VIEW THE EARTH AND THEN THE SKY. I.E., WHEN ONE SENSOR VIEWED THE EARTH. THE OTHER SENSOR SAW THE SKY. BOTH SENSORS HAD A 2.5-DEG CIRCULAR FIELD OF VIEW. WITH THE USE OF A BEAM COMBINER ARRANGEMENT. THE SAME PHOTOMULTIPLIER ACCEPTED THE TWO INPUTS. THE DYNAMIC RANGE OF INTENSITY MEASUREMENTS WAS FROM ABOUT 10 R TO MORE THAN ONE MEGARALEIGH. SUNLIGHT COULD ENTER THE OPTICAL SYSTEMS DIRECTLY IN ADDITION TO EARTH-REFLECTED LIGHT. THE INSTRUMENT BAFFLE WAS ILLUMINATED BY THE SUN ONLY FOR THE OFF-AXIS ANGLES LESS THAN 47 DEG. OUTSIDE THIS LIMIT. THE DATA WERE NOT DEGRADED BY SUNLIGHT, PERMITTING NORMAL OPERATION IN THE REGION OF THE CRBIT WHERE THE SPACECRAFT WAS IN SUNLIGHT BUT THE PORTION OF THE EARTH BENEATH IT WAS DARK. AN EXTERNAL LIGHT SCURCE "SAW" THE FILTER ONLY WHEN IT WAS 7.5 DEG OR LESS OFF AXIS. IN THE RANGE 7.5 TO 47 DEG. GOOD DATA WERE STILL OBTAINED WHEN THE SUNLIT EARTH WAS THE ORIGIN OF THE CONTAMINATION. TO GIVE ACCURATE LOW LIGHT LEVEL READINGS. AS WELL AS COVER THE FULL DYNAMIC RANGE. AND TO PRESENT THE MEASUREMENTS IN A FORM COMPATIBLE WITH ENCODING AS AN 8-BIT BINARY WORD FOR TELEMETRY. A HYERIC LINEAR-LOG AMPLIFIER SYSTEM WAS USED. THE ELECTRONIC SYSTEM PULSE COUNTED AT LOW LIGHT LEVELS AND AMPLIFIED ON A LOG SCALE FOR HIGHER LIGHT LEVELS. IT WAS COMPOSED OF A PREAMP, THO SIGNAL PROCESSING CHANNELS (LINEAR AND LOGARITHMIC), AND AN OUTPUT COMMUTATOR TO SELECT BETWEEN THEM AS WELL AS TO INTERFACE THEN TO THE SPACECRAFT SYSTEM. ALSO PROVIDED WERE CALIBRATION AND PROTECTION CIRCUITRY TO OPERATE THE CALIBRATE LAMPS AND TO PROTECT THE PHOTOTUBE FROM THE EFFECTS OF EXPOSURE TO HIGH LIGHT LEVELS. TO PERFORM THE DATA ANALYSIS, IT WAS NECESSARY, AMONG OTHER OPERATIONS. TO EVALUATE DIFFERENT GEOMETRICAL SITUATIONS. AND TO LOCATE THE ON-EARTH LIMB CROSSING OF THE 12 A BANDPASS PHOTOMETER SO THAT THE DATA COULD BE ORGANIZED INTO SPIN MAPS.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- EXPLORER 44 NSSDC ID 71-058A
ALTERNATE NAMES- SOLRAD 10, SOLAR EXPLORER-C, SE-C. SOLRAD-C. PL-703A

LAUNCH DATE- 07/08/71 SPACECRAFT WEIGHT IN GRBIT- 118. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES
NASA-OSSA

INITIAL CREIT PARAMETERS

EPOCH DATE- 07/09/71 ORBIT TYPE- GEOCENTRIC ORBIT PERICD- 95.23 MIN

APOAPSIS- 632.000 KM ALT PERIAPSIS- 433.000 KM ALT INCLINATION- 58.06 DEG

RECENT ORBIT PAPAMETERS

EPOCH DATE- 01/28/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.027 MIN

APDAPSIS- KM ALT PERIAPSIS- 435. KM ALT INCLINATION- 51.0465 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FRCJECT SCIENTIST)

PM - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

PM - E.W. PETERKIN NAVAL RESEARCH LAB WASHINGTON, DC

NAVAL RESEARCH LAB WASHINGTON, DC

#### SPACECRAFT BRIEF DESCRIPTION

KREPL IN

PS - R.W.

SOLRAU 10. A SPIN-STABILIZED SATELLITE, WAS ONE IN A SERIES OF SPACECRAFT DESIGNED TO PROVIDE CONTINUOUS COVERAGE OF MAVELENGTH AND INTENSITY CHANGES IN SOLAR RADIATION IN THE UV. SCFT. AND HARD X-RAY REGIONS. (THE FIRST SPACECRAFT IN THIS SERIES, SR-1, WAS LAUNCHED IN 1960.) SOURAD 10 ALSO MAPPED THE CELESTIAL SPHERE USING A HIGH-SENSITIVITY X-RAY DETECTOR. THE SPACECRAFT WAS A 12-SIDED CYLINDER THAT MEASURED 76 CM IN DIAMETER AND 58 CM IN HEIGHT, FOUR SYMMETRICALLY FLACED 17.8- BY 53.3-CM SOLAR CELL PANELS: FINGED AT THE CENTER SECTION OF THE STRUCTURE: SERVED AS THE ELEMENTS OF A TURNSTILE ANTENNA SYSTEM. EIGHTEEN SCLAR SENSORS WERE MOUNTED POINTING PARALLEL TO THE SPIN AXIS OF THE SATELLITE, WHICH POINTED DIRECTLY AT THE SOLAR DISK. THE PLANE OF ROTATION SHIFTED ACCUT 1 DEG/DAY SO THAT A STELLAR DETECTOR MOUNTED TO POINT RADIALLY CUTWARD FROM THE AXIS SCANNED THE CELESTIAL SPHERE. THE EXPERIMENTS WERE TURNED ON AT 1430 UT ON JULY 9, 1971. CATA FROM ALL DETECTORS WERE STORED IN A 54-K8S CORE MEMORY AND TELEMETERED ON COMMAND TO THE NRL TRACKING STATION AT BLOSSOM PT., MD. THE FIRST CORE DUMP WAS OBTAINED AT 2100 UT ON JULY 9, 1971. DATA WERE ALSO TRANSMITTED IN REAL TIME AT 137.710 MHZ. THE CORE MEMORY FAILED IN JULY. 1973. UNLY REAL-TIME CATA WERE TAKEN AFTER THAT TIME.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR RADIATION CETECTORS

NESDC 10 71-058A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR) PI = R\*W\* KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

### EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MONITOR THE SOLAR X-RAY FLUX IN EIGHT BANDS AND THE SOLAR UV FLUX IN FIVE BANDS AS PART OF A LONG-TERM PROJECT TO DBSERVE SOLAR X-RAY AND UV ACTIVITY WITH SETS OF STANDARDIZED SENSORS OVER AN ENTIRE SULAR CYCLE. THE X-RAY BANDS CESERVED WERE 0.08 TO 0.8 A. 0.1 TO 1.6 A, 0.5 TO 3 A, 1 TO 5 A, 1 TO 8 A, 8 TO 16 A, 1 TO 20 A, AND 44 TO 60 A. ALL THE DETECTORS FOR THESE BANDS, WITH THE EXCEPTION OF THAT FOR THE 0.08-TO 0.8-A BAND, WERE ION CHAMBERS FITTED WITH A VARIETY OF WINDOW MATERIAL (BERYLLIUM, ALUMINUM, AND MYLAR) OF VARIOUS THICKNESSES AND FILLED WITH SEVERAL DIFFERENT GASES (KRYPTON, ARGON, NITROGEN, CARBON TETRACHLORIDE, AND XENON) AT VARIOUS PRESSURES. THE 0.08- TO 0.8-A BAND HAD AS A DETECTOR A CESIUM IODIDE (NA) SCINTILLATING CRYSTAL SURROUNDED BY A PLASTIC SCINTILLATING MATERIAL VIEWED BY A SINGLE PHOTOMULTIFLIER. THIS DETECTOR WAS DESIGNED TO COLLECT DATA ON THE VERY-HIGH-ENERGY SCLAR X-RAY EMISSION DESERVED ONLY DURING SOLAR FLARES. THE UV BANDS COSERVED WERE 170 TO 500 A. 170 TO 700 A. 1080 TO 1350 A. 1225 TO 1350 A. AND 1450 TO 1600 A. THE TWO SHORTER WAVELENGTH BANDS HAD LITHIUM FLUGRIDE, PHOTOSENSITIVE SURFACES PROTECTED BY ALUMINUM, ALUMINUM OXIDE, AND CARBON WINDOWS FOR DETECTORS WHILE THE REMAINING BANDS HAD ION CHAMBERS WITH WINCOWS COMPOSED OF LITHIUM FLUGRIDE, CALCIUM FLUGRIDE, OR SILICON DIEXIDE, AND VARIOUS GAS FILTERS (NITRIC DXIDE OR TRIETHYLAMINE 8). SOME OF THE SOLAR DETECTORS WERE PROTECTED FROM CHARGED PARTICLES BY CONE-SHAPED ALLMINUM COLLIMATORS. THE DATA WERE TRANSMITTED OVER TWO TELEMETRY SYSTEMS IN CAE OF THREE FORMS --STORED DATA. REAL-TIME DIGITAL (PCM) DATA. AND REAL-TIME ANALOG DATA. TELEMETRY SYSTEM 1 (TM 1) USED A PAM/POM/FM/PM TRANSMITTER THAT OPERATED AT 137.710 MHZ WITH A RACIATED POWER OF 250 MW. UNDER NORMAL OPERATING CONDITIONS. TM 1 CONTINUOUSLY TRANSMITTED ANALOG AND PCM REAL-TIME DATA.

ALTHOUGH THE REAL-TIME DIGITAL PCM WAS THE PRIMARY REAL-TIME TRANSMISSION FORMAT. TELEMETRY SYSTEM 2 (TM 2) USED A PCM/PM TRANSMITTER THAT OPERATED AT 136.380 MHZ WITH A RACIATED POWER OF 250 MW. TM 2 TRANSMITTED STORED DATA (UP TO ONE DATA SAMPLE PER MINUTE FOR 14.25 HR) CN COMMAND.

ON 07/00/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 07/00/73, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ALL-SKY X-RAY SURVEY

NSSDC ID 71-058A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=OTHER INVESTIGATOR)
PI -- R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON: DC

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MAP THE X-RAY SKY IN THE 0.5- TO 15-A REGION. THE DETECTOR. MOUNTED ON THE SIDE OF THE SPACECRAFT. WAS A LARGE-AREA PROPERTIONAL COUNTER MOUNTED TO POINT RADIALLY OUTWARD FROM THE SPIN AXIS, WHICH POINTED CONTINUALLY TOWARD THE SUN. THE DETECTOR WINDOW WAS MADE OF 1/8-MIL-THICK MYLAR WITH AN EFFECTIVE AREA OF 100 SO CM. THE GAS FILLER WAS A MIXTURE OF 0.45 ARGON: 0.45 XERON: AND 0.10 CARBON DICXIDE MAINTAINED AT 4 LE/SQ CM. A COLLIMATOR LIMITED THE FIELD OF VIEW TO 8 DEG (FULL-WIDTH AT HALF-MAXIMUM) IN A PLANE CONTAINING THE SPIN AXIS AND 1 DEG (FWHM) IN THE PLANE PERPENDICULAR TO THE SPIN AXIS. CHARGED PARTICLE INFORMATION WAS PROVIDED BY PROPORTIONAL COUNTERS MOUNTED ON THREE SIDES OF THE X-RAY DETECTOR. ASPECT INFORMATION WAS PROVIDED BY A BLUE-SENSITIVE PHOTOMULTIPLIER CAPABLE OF DETECTING ALL FOURTH-MAGNITUDE AND NOT FIFTH-MAGNITUDE STARS. THE RESOLUTION OF THE ASPECT SYSTEM AND THE ACCURACY WITH WHICH THE EXPERIMENT COULD LOCATE X-RAY SQURCES WAS EETTER THAN PLUS OR MINUS 0.25 DEG. THE DETECTOR WAS CONNECTED TO A 400-CHANNEL FULSE TIME ANALYZER WHICH WAS SYNCHRONIZED WITH THE SPIN PERIOD TO GIVE A 2-DEG SPATIAL RESOLUTION IN THE SPIN DIRECTION. THE WHOLE CELESTIAL SPHERE WAS SURVEYED EVERY SIX MONTHS.

ON 07/00/73. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACCULSITION RATE BECAME SUB-STANDARD.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACECRAFT COMMON NAME- APOLLO 15 LM/ALSEP NSSDC ID 71-063C ALTERNATE NAMES- APOLLO 15C. ALSEP 15, LEW 15, ROVER 15, 05366

LAUNCH DATE- 07/26/71 SPACECRAFT WEIGHT IN CREIT- 12700. KG

LAUNCH SITE- CAPE KENNEDY . UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY

UNITED STATES

NASA-CMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)
PM + R. PETRONE NASA HEADQUARTERS WASHINGTON. DC

SPACECRAFT ERIEF DESCRIPTION

THE APOLLE 15 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV). AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE MOON AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE NORTH CENTRAL PART OF THE MOON (26 DEG 4 MIN 54 SEC N LATITUCE. 3 DEG 39 MIN 30 SEC E LONGITUDE). AT THE FOOT OF THE APENNINE MOUNTAIN RANGE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING THE EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR POWERED ALSEP CONTAINED SEISMIC. MAGNETIC FIELDS, LUNAR ATMOSPHERE COMPOSITION, IGN COMPOSITION, LUNAR DUST, SOLAR WIND COMPOSITION, HEAT LOSS, AND SOLAR CELL RADIATION DAMAGE EXPERIMENTS.

ON 07/30/71. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC IC 71-063C-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) PI - G.V. LATHAM U OF TEXAS GALVESTON. TX 01 - W.M. EWING CCLUMBIA U NEW YORK. NY 01 - F. PRESS MIT CAMBRIDGE. MA 01 - G. SUTTON L OF HAWAII HCNCLULU. HT

### EXPERIMENT ERIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE). PART OF THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), MEASURED SEISMIC SIGNALS FROM BOTH EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE MEASUREMENTS OBTAINED HAVE BEEN USED TO DETERMINE THE INTERNAL STRUCTURE OF THE NOON, THE RATE OF ENERGY RELEASE. AND THE NUMBERS AND MASSES OF METEOROIDS IMPACTING THE LUNAR SURFACE. THE LUNAR SURFACE IMPACTS OF THE SPENT S-IVB AND LM ASCENT STAGES WERE USED AS EXTERNAL CALIBRATION SOURCES FOR THE SEISMOMETERS. THE KNOWN MASS AND VELOCITY OF THESE STAGES AT SURFACE IMPACT AND THE LUNAR IMPACT POINT COURCINATES ENABLED THE COMPUTATION OF ENERGY GENERATED AT IMPACT AND THE POINT OF ENERGY APPLICATION. (THE CALIBRATICN CHARACTERISTICS WERE DETERMINED BY MEASURING SEISMOMETER RESPONSE TO THESE ENERGY SOURCES.) THE EXPERIMENT. WHICH WAS DEPLOYED 110 M WEST OF THE LM. CONSISTED OF TWO SEISMIC ASSEMBLIES -- A LONG PERIOD (LP) SEISMOMETER (TRIAXIAL. ORTHOGONAL) WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80-DB DYNAMIC RANGE) AND A SHURT PERIOD (SP) SEISMOMETER (UNIAXIAL, VERTICAL METION) WITH A SEISMIC FREQUENCY FROM 0.05 TO 20 HZ (80-CB CYNAMIC FANGE). THE MINIMUM DETECTABLE SIGNAL OF THE PSE SEISMOMETERS WAS 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE SEISMOMETERS WERE HOUSED IN A DRUN-SHAPED ENCLOSURE ROUNDED IN THE BUTTOM. THIS ENCLOSURE RESTED ON A SUPPORT STRUCTURE (STOOL) AND WAS COVERED BY A THERMAL SHEQUO AFTER DEPLOYMENT OF THE EXPERIMENT. THE SEISMOMETERS WERE OPERATING NORMALLY AS OF AUGUST 1972. THE APOLLO 15 SEISMONETER WAS PART OF A TRIANGULAR NETWORK OF SEISMOMETERS THAT INCLUDED THE APOLLO 12 AND 14 SEISMOMETERS. (THE APOLLO 11 SEISMOMETER CEASED FUNCTIONING ABOUT 2 MONTHS AFTER CEFLOYMENT ON JULY 20. 1969). FOUR MAJOR DISCOVERIES HAVE RESULTED FROM THE SEISMOMETER EXPERIMENTS -- (1) THE EXISTENCE OF A CRUST

AND MANTLE. (2) CEPTH OF FOCUS OF CYCLIC MOON QUAKES AT 800 KM. (3) SWARMS OF NON-CYCLIC MCONQUAKES. AND (4) EFFICIENT SCATTERING OF ENERGY IN A NEAR-SOURCE REGION.

ON 07/30/71, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/31/71. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSOC ID 71-063C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=OTHER INVESTIGATOR)
PI - J.W. FREEMAN RICE U HOLSTON. TX

# EXPERIMENT BRIEF DESCRIPTION

THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND FROM THE FREE STREAMING SOLAR WINC/LUNAR SURFACE INTERACTION. FLUX. NUMBER CENSITY. VELOCITY, AND ENERGY PER UNIT CHARGE WERE DETERMINED FROM THE DATA OBTAINED. A CURVED PLATE ANALYZER AND E CROSS B VELCCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV. SPECIES DISCRIMINATION OF MASSES UP TO 120 AND WAS FOSSIBLE. A SEPARATE CURVED PLATE ANALYZER COUNTED SOLAR WIND FROTONS IN SELECTED ENERGY INTERVALS FROM 10 TO 3500 EV. OPERATION WAS NORMAL UNTIL LUNAR NOON ON DECEMBER 16. 1971. WHEN SENSOR TEMPERATURE EXCHEDED 85 DEG C. OPERATION WAS CURTAILED DUE TO POWER SUPPLY ARCING. DATA FROM CTHER PERIODS OF CPERATION WERE NORMAL.

ON 07/30/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/16/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- FEAT FLOW

NSSDC ID 71-063C-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - M.G. LANGSETH LAMONT-DOHERTY GEO GES FALISACES, NY

OI - S. CLARK YALE U NEW HAVEN. CT

#### EXPERIMENT BRIEF DESCRIPTION

THE HEAT FLOW EXPERIMENT (HFE). WHICH WAS PART OF THE ALSEP, WAS DESIGNED TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. THE EXPERIMENT DETECTED LUNAR TEMPERATURES OF THE FOLLOWING TYPES AND RANGES. WITH CORRESPONDING ACCURACIES NOTED IN PARENTHESES -- HIGH-SENSITIVITY MEASUREMENTS OF FLUS OR MINUS 2 DEG C (C.C.3 DEG C) TEMPERATURE DIFFERENCE. PROBE AMBIENT TEMPERATURES FROM 200 DEG K TO 250 DEG K (0.1 DEG K). THERMOCOUPLE REFERENCE TEMPERATURE FROM -20 DEG C TO -60 DEG C (0.1 DEG C). AND FROBE CABLE AMBIENT TEMPERATURES FROM 90 DEG K TO 250 DEG K (0.3 DEG K). THE INSTRUMENTATION CONSISTED OF TWO 1.2-M PROBES THAT WERE INSERTED INTO THE LUNAR SURFACE. A SPECIAL TOOL FOR FRORE INSERTION. AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE CENTRAL

STATION. TO ENABLE PLACEMENT OF THE PROBES INTO THE LUNAR SURFACE, TWO 3-M HOLES WERE DRILLED IN THE SURFACE BY ASTRONAUT SCITT USING THE APOLLO LUNAR SURFACE DRILL (ALSD). THE ALSD WAS EQUIFFED WITH CORE STEW CAFS AND RETAINERS, CORE STEMS. CORE BITS. A BORE BIT/DRILL ADAPTER, A TREADLE. AND A BORE STEM/CORE STEM WRENCH. THE BORE STEM ASSEMBLIES USED IN DRILLING REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT COLLAPSE OF THE HOLE WALLS DURING INSERTION OF THE PROBES. PRELIMINARY RESULTS OF THE EXPERIMENT INDICATE A LUNAR HEAT FLOW OF 3.3 TIMES 10 TO THE MINUS 6 W/CM SQ. WHICH IS ONE-HALF THAT OF THE EARTH. THE RATE OF TEMPERATURE INCREASE AS A FUNCTION OF DEPTH IS 1.75 DEG K PER M. TEMPERATURE MEASUREMENTS WERE ALSO CETAINED DURING LUNAR NIGHT AND DURING A TOTAL ECLIPSE ON AUGUST 6, 1971.

ON 07/30/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/31/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT

NSSDC ID 71-063C-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CI=OTHER INVESTIGATOR)

PI - F.S. . JOHNSON OI - D.E.

U OF TEXAS NASA-JSC

DALLAS. TX HOLSTON. TX

EVANS EXPERIMENT BRIEF DESCRIPTION

THE ALSEP COLD CATHODE GAUGE EXPERIMENT MEASURED THE CENSITY OF NEUTRAL ATOMS AND DETERMINED PRESSURES OF THE AMBIENT LUNAR ATMOSPHERE FROM 10 TO THE -6 POWER TO 10 TO THE -12 POWER TORR. THE DATA OBTAINED COMPLEMENTED MEASUREMENTS MADE BY THE ALSEF SUPRATHERMAL ICA DETECTOR. DATA WERE NORMAL UNTIL DECEMBER 12. 1971 WHEN A POWER SUFFLY ARCING CURTAILED OPERATION WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C. OTHER DATA WERE USABLE.

ON 07/30/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/16/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- LUNAR DUST DETECTOR

NSSDC ID 71-063C-09

EXPERIMENT PERSONNEL (PISPRINCIPAL INVESTIGATOR, DISOTHER INVESTIGATOR) PI - J.R. BATES NASA-JSC HOUSTON: TX

# EXPERIMENT BRIEF DESCRIPTION

THE FUNCTION OF THE ALSEP LUNAR CUST DETECTOR EXPERIMENT WAS TO SEPARATE AND MEASURE HIGH-ENERGY RADIATION DAMAGE TO THREE SOLAR CELLS: TO MEASURE REDUCED SOLAR CELL CUTPUT DUE TO CUST ACCUMULATION, AND TO MEASURE REFLECTED INFRARED ENERGY AND TEMPERATURES FOR USE IN COMPUTING LUNAR SURFACE TEMPERATURES. THE DUST DETECTOR HAD TWO CEMPENENTS -- SENSOR PACKAGE MOUNTED TO THE TOP OF THE CENTRAL STATION SUN SHIELD, AND A FRINTED CIRCUIT BOARD LUCATED WITHIN THE CENTRAL STATION THAT INTERFACED WITH THE POWER DISTRIBUTION UNIT OF THE ALSEP DATA SUBSYSTEM. THE EXPERIMENT WAS SIMILAR TO THAT DEPLOYED ON APOLLO 12 AND 14.

ON 07/30/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION HATE BECAME STANDARD.

ON 07/31/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- 050 7
ALTERNATE NAMES- 050-H, 05491

NESDC ID 71-083A

LAUNCH DATE- 09/29/71 SPACECRAFT WEIGHT IN ORBIT-

635. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES

NASA-OSSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 10/02/71 DREIT TYPE- GEOCENTRIC CRBIT PERICD- 93.40 MIN

APDAPS IS- 571.000 KM ALT PERIAPSIS- 323.000 KM ALT INCLINATION- 33.13 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/04/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 91.769 MIN

APDAPSIS- 424.71 KM ALT FERIAPSIS- 297.88 KM ALT INCLINATION- 33.127 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. FS=FRCJECT SCIENTIST)

PM - R.H. PICHARD NASA-GSFC GREENELT. MO
PS - S.P. MARAN NASA-GSFC GREENBELT. PO

# SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVES OF THE OSO SATELLITE SERIES WERE TO PERFORM SCLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SCLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT AND X-RAY AND GAMMA RACIATION. THE CSO 7 FLATFORM CONSISTED OF A SAIL SECTION. WHICH FOINTED TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN, AND A WHEEL SECTION. WHICH SPUN ABOUT AN AXIS PERPENDICULAR TO THE POINTING DIRECTION OF THE SAIL AND CARRIED FOUR EXPERIMENTS. ATTITUDE ADJUSTMENT WAS PERFORMED BY GAS JETS AND A MAGNETIC TORQUING COIL. A FOINTING CONTROL PERMITTED THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN A 40- BY 40-ARC-MIN RASTER PATTERN. IN ACCITION, THE FOINTED SECTION COULD BE COMMANDED TO SELECT AND SCAN ANY 7.5- BY 7-ARC-MIN REGION NEAR THE SCLAR DISK. DATA WERE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY POM/PM TELEMETRY. A COMMAND SYSTEM PROVIDED FOR AT LEAST 155 GROUND-BASED COMMANDS. REAL TIME DATA FAS ONLY BEEN RECEIVED SINCE MAY 1573. WHEN THE SECOND TAPE RECORDER FAILED.

ON 05/18/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME - X-RAY AND EUV SPECTROHELIOGRAPH (2 TC NSSDC ID 71-083A-01 400 A)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - W.M. NEUPERT NASA-GSFC GREENBELT. MD or - J.H. UNDERWOOD NASA-GSEC GREENEELT, MC 01 - R.D. CHAPMAN NASA-GSEC GREENBELT, MD 01 - R.V. THOMAS NA SA +GSFC GREENBELT. MD

#### EXPERIMENT ERIEF CESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO DETERMINE THE DISTRIBUTION OF MATTER AND TEMPERATURE IN THE CORONA ABOVE SULAR ACTIVE REGIONS AND DETERMINE HOW THIS MATTER CHANGES DURING SOLAR FLARES. FOUR DISTINCT INSTRUMENTS WERE USED. THE FIRST WAS A GRAZING-INCIDENCE SPECTROMETER WITH A SPECTRAL RESOLUTION OF 1.0 A, USED TO COVER THE RANGE 170 TO 400 A. THE VARIOUS DISCRETE WAVELENGTHS WERE DETECTED BY THREE BENDIX ELECTRON MULTIPLIERS MOUNTED ON A MOVING CARRIAGE. SECOND, A LONG X-RAY SPECTROHELIOGRAFF WITH A BANDPASS OF 2 A WAS USED TO COVER THE RANGE 8 TO 15 A. THE THIRD INSTRUMENT WAS A SHORT X-RAY SPECTFOHELIOGRAFH. USED TO COVER THE RANGE 1.7 TC 2.5 A. BOTH SPECTROHELIOGRAPHS USED THE BALANCED FILTER METHOD. FOURTH, # PCLARIMETER USING THE SCATTERING TECHNIQUE WAS USED TO COVER THE 20 TO 40 KEV RANGE. THE SPATIAL RESOLUTION OF THE EUV SPECTROHELIOGRAPH WAS 10 X 20 ARC SECONDS. THE SPATIAL RESOLUTION OF X-RAY SPECTROHELIOGRAPHS WAS 20 X 20 ARC SECONDS. THE SHORT EUV DETECTOR FAILED IN MARCH 1972. THE MEDIUM EUV DETECTOR SENSITIVITY STAFFED DROPPING CURING OCTOBER 1972. AND BY MARCH 1973 WAS 60 PERCENT OF THE ORIGINAL VALUE. THE LONG EUV DETECTOR DEGRADED TO THE POINT THAT IT NO LONGER PRODUCED USEFUL SCIENTIFIC DATA AS UF MAY 1973. ONLY REAL-TIME DATA WERE DETAINED AFTER MAY 18. 1973 WHEN THE SPACECRAFT TAPE RECORDER FAILED.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- WHITE-LIGHT CORONOGRAPH AND EXTREME ULTRAVIOLET CORONOGRAPH

NSSCC ID 71-083A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - R. TOUSEY NAVAL RESEARCH LAB WASHINGTON, DC

#### EXPERIMENT ERIEF DESCRIFTION

THIS EXPERIMENT WAS DESIGNED (1) TO STUDY THE MORPHOLOGY OF THE CORONA IN WHITE LIGHT AND THE EXTREME UV IN RELATION TO ACTIVE PHENOMENA, SUCH AS PLAGES AND FLARES IN THE LOWER SOLAR ATMOSPHERE, AND (2) TO CORRELATE THE WHITE LIGHT CORCNA WITH THE EXTREME UV CORONA AND WITH SOLAR AND INTERPLANET ARY MAGNET IC FIELDS. THE INSTRUMENTATION WAS LOCATED WITHIN THE POINTED SECTION OF THE SPACECRAFT AND CONSISTED OF (1) A WHITE LIGHT CORCNAGRAPH FOR USE IN THE POINTED MODE TO RECORD THE OUTER CORCNA OF THE SUN FROM APPROXIMATELY 3 TO 10 SOLAR RADII IN THE VISIBLE BAND OF 3900 TO 6500 A AND (2) AN EXTREME UV CORONAGRAPH FOR USE IN THE RASTER MODE TO RECORD THE UPPER CHROMOSPHERE AND LOWER CORONA FULLY TO TWO SOLAR RADII AND PARTIALLY TO FIVE SOLAR RADII IN THE BAND FROM 170 TO 550 A. THE WHITE LIGHT INSTRUMENT WAS A MODIFIED LYDT CORONAGRAPH THAT ARTIFICIALLY ECLIPSED THE SUN WITH A SPAR-MOUNTED EXTERNAL OCCULTING DISC ASSEMBLY MOUNTED APPROXIMATELY 76 CM IN FRONT OF THE INSTRUMENT. THE FAIRT CUTER CORONA COULD THEN BE OBSERVED AGAINST THE BLACK SKY OF SPACE. THE IMAGE WAS STORED IN A SEC VIDICON TUBE WITH 256 PICTURE ELEMENTS AND AN ANGULAR RESOLUTION OF 1.25 ARC-MIN. THE EXTREME UV CORDNAGRAPH REQLIRED NO OCCULATION DEVICE SINCE THE

SOLAR DISC WAS NOT AN OVERWHELMING SOURCE OF EXTREME UV RADIATION. THERE WERE FOUR OPEN-TO-VACUUM CHANNEL PHOTOMULTIPLIER DETECTORS IN THE IMAGE PLANE BEHIND THE APERTURE PLATE. THE SUN-CENTERED AFERTURE DETECTOR HAD A SPATIAL RESOLUTION OF 20 ARC-SEC. THE REMAINING APERTURE DETECTOR COMBINATIONS WERE OFFSET. EXCLUDING THE DISC. AND HAD A RESOLUTION OF 60 ARC-SEC. IN A LARGE RASTER MODE. THE SCANNED AREAS EVERLAPPED. THE EXPERIMENT OPERATED NORMALLY UNTIL MARCH 1972. WHEN IT BECAME PARTIALLY OPERABLE. THE EXTREME UV CORONAGRAPH DEGRADED UNTIL IT BECAME USELESS IN SEPTEMBER 1973.

ON 05/18/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 09/00/73. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC X-RAY EXPERIMENT

NSSCC ID 71-083A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=(THER INVESTIGATOR)
PI - L.E. PETERSON U OF CALIFCRNIA, SD LA JCLLA, CA

# EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENT MEASURED INTENSITY. POSITION, AND SPECTRUM OF COSMIC X-RAY SOURCES IN THE 10- TO 30 C-KEV RANGE. THE BASIC DETECTOR WAS A LARGE SODIUM IODIDE SCINTILLATION CRYSTAL WITH AN ANTICOINCIDENCE SHIELD COLLIMATOR WHICH PROVIDED APPROXIMATELY A 3-DEG HALF-ANGLE FIELD OF VIEW. EACH EVENT WAS ANALYZED WITH A 128-CHANNEL PULSE-HEIGHT ANALYZER. THE WHOLE CELESTIAL SPHERE WAS SURVEYED EVERY & MONTHS.

ON 05/18/73. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED EXFERINENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC X-RAY SCURCES IN THE RANGE NSSDC ID 71-083A-04
1.5 TO 9 A

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=(THEF INVESTIGATOR)

PI - G.W. CLARK MIT CAMERIDGE, MA

OI - H.V.D. ERADT MIT CAMERIDGE, MA

OI - W.H.G. LEWIN MIT CAMERIDGE, MA

OI - W.H.G. LEWIN MIT CAMERIDGE. MA
DI - H.W. SCHNOPPER MIT CAMERIDGE. MA

# EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO SURVEY THE ENTIRE SKY FOR COSMIC X-RAY SOURCES IN THE ENERGY RANGE 1 TO 60 KEV WITH AN ANGULAR RESOLUTION OF ABOUT 1 DEG. AND PERFORM SPECTRAL ANALYSIS IN 5 BROAD BANDS. EACH PORTION OF THE SKY WAS VIEWED SEVERAL TIMES DURING EACH YEAR OF OPERATION. TWO MULTICOMPARTMENTED PROPORTIONAL COUNTERS EQUIPPED WITH HONEYCOME COLLIMATORS (3.5 SQ DEG SOLID ANGLE) WERE MOUNTED IN ONE SEGMENT OF THE CSO WHEEL SECTION. WITH THE CENTERS OF THEIR FIELDS-OF-VIEW ORIENTED 15 DEG ABOVE AND 15 DEG BELOW THE SPACECRAFT EQUATOR. X RAYS WERE DETECTED IN ONE OF ANOTHER OF FOUR COMPARTMENTS DEPENDING UPON THEIR ENERGY. LOW-ENERGY PHOTONS WERE STOPPED IN THE FIRST COMPARTMENT. HIGHER-ENERGY PHOTONS PENETRATED TO THE

SECOND COMPARTMENT, PHOTONS OF EVEN HIGHER ENERGIES PENETRATED THROUGH THE FIRST AND SECOND COMPARTMENTS TO THE THIRD AND FOURTH COMPARTMENTS. THE ENERGY BANDS WERE LOGARITHMICALLY EQUISPACED. A SEPARATE SINGLE COMPARTMENT COUNTER WITH A THIN ALUMINUM WINDOW DETECTED PHOTONS BETWEEN 1.0 AND 1.5 KEY. COUNTS FROM EACH COMPARTMENT WERE STORED IN ONE OF 256 ACCUMULATORS CORRESPONDING TO A DIVISION OF THE SPACECRAFT SPIN INTO 256 SECTORS. IN-FLIGHT CALIBRATION WAS PROVIDED BY PERIODIC EXFOSURE TO A RACICACTIVE SOURCE. ACCURATE ASPECT INFORMATION WAS PROVIDED BY A STAR SENSOR.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/18/73, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- HARD SOLAR X-RAY MONITORING

NSSDC ID 71-083A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L.E. PETERSON U OF CALIFORNIA, SD LA JOLLA, CA

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT MEASURED HARD SOLAR X-RAY BURSTS IN THE ENERGY RANGE 2 TO 300 KeV. THE DETECTOR WAS A LARGE SCOLUN IODIDE SCINTILLATION CRYSTAL WITH AN ANTICOINCIDENCE COLLIMATOR-SHIELD HAVING A FAN-SHAFED AFERTURE OF ABOUT 0.1 STER. X-RAY EVENTS WERE PULSE-HEIGHT ANALYZED INTO 10 LOGARITHMICALLY EQUISPACED CHANNELS WITH A TIME RESOLUTION WHICH WAS EQUAL TO THE SFIN PERICO (APPROXIMATELY 2 SEC).

ON 05/18/73, THE CATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NO FMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 09/29/73, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME~ EXPLORER 45 ALTERNATE NAMES~ SSS-A. S-CUBED A. CEESE

NSSDC 1D 71-096A

LAUNCH DATE- 11/15/71

SPACECRAFT WEIGHT IN ORBIT-

48 . KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

UNITED STATES

NASA-OSSA

INITIAL CREIT PARAMETERS

EPOCH DATE- 09/06/73 GRBIT TYPE- GEOCENTRIC GEBIT PERICD- 438.06 MIN APDAPSIS- 25175.8 KM ALT PERIAPSIS- 281.25 KM ALT INCLINATION- 3.539 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/06/73 ORBIT TYPE- GEOCENTRIC

ORBIT PERÍOD- 438.06 MIN

PERIAPSIS- 261-25 KM ALT INCLINATION- 3-539 DEG APDAPSIS- 25175.E KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

NASA-GSFC LONGANECKER PM - G.W.

GREENBELT. MD

PS - R.A. HOFFMAN NASA-GSFC

GREENBELT. ND

### SPACECRAFT BRIEF DESCRIPTION

EXPLORER 45 WEIGHED APPROXIMATELY 100 LB. IT WAS DESIGNED TO PERFORM A VARIETY OF MISSIONS WITHIN THE MAGNETOSPHERE. EXFLORER 45 WAS DESIGNED TO INVESTIGATE THE PARTICLE FLUXES, ELECTRIC FIELDS, AND MAGNETIC FIELDS OF THE MAGNETOSPHERE. ITS OBJECTIVES WERE TO STUDY THE RING CURRENT AND DEVELOPMENT OF THE MAIN PHASE MAGNETIC STORM. THE ACCELERATION OF CHARGED PARTICLES WITHIN THE MAGNETOSPHERE, AND THE TIME VARIATIONS OF THE CHARGED PARTICLE POPULATION. EXPLORER 45 FAD THE CAPABILITY FOR COMPLETE INFLIGHT CONTROL OF THE DATA FORMAT THROUGH THE USE OF AN ONECARD SET OF STORED PROGRAM INSTRUCTIONS. THESE INSTRUCTIONS GOVERNED THE COLLECTION OF DATA AND WERE REPROGRAMMABLE VIA GROUND COMMAND. THE ANTENNA SYSTEM CONSISTED OF FOUR DIPCLE ANTENNAS. THE TRANSMITTER HAD TWO DIFFERENT NODES--A HIGH-POWER MODE (14,080 BPS, FOR USE WHEN THE DATA WERE BEING TRANSMITTED FROM THE TAPE RECORDER) AND A LOW-POWER MODE (440 BPS. FOR USE WHEN THE DATA WERE BEING TRANSMITTED IN REAL TIME). THE BIT RATE INTO THE TAPE RECERDER WAS 440 EPS. THE TAPE RECORDER HAD A CAPACITY OF 6.8 HR. COVERING MOST OF THE PLANNED 7-HR URBIT. THE SATELLITE POWER SYSTEM CONSISTED OF A RECHARGEABLE BATTERY AND AN ARRAY OF SOLAR CELLS. THE SPIN FATE WAS TO BE 4 REM. AND THE SPIN AXIS WAS TO LIE IN THE PLANE OF THE ORBIT. THE INITIAL LOCAL TIME OF APOGEE WAS TO BE TOWARD THE MICHIGHT MERICIAN.

ON 11/15/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CHANNEL ELECTRON MULTIPLIERS WITH ELECTROSTATIC ANALYZERS

NSSDC ID 71-0964-01

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED CYLINDRICAL CURVED-PLATE ELECTROSTATIC ANALYZERS IN CONJUNCTION WITH CHANNEL ELECTRON MULTIPLIERS TO STUDY PROTON AND ELECTRON DIRECTIONAL INTENSITIES IN 8 CF 16 CONTIGUOUS ENERGY INTERVALS IN THE ENERGY RANGE 800 EV-25 KEV. UNDER NORMAL OPERATION, THE VOLTAGE STEPS WERE SYNCHRUNIZED TO EITHER THE HALF ROLL OR FULL ROLL OF THE SATELLITE. DUAL DETECTOR SYSTEMS WERE USED TO EXTEND THE DYNAMIC RANGE OF THE INSTRUMENT. A COMPLETE SET OF MEASUREMENTS WAS OBTAINED EVERY 64 SEC. THIS PERIOD WAS REPROGRAMMABLE. THERE WERE TWO ELECTROSTATIC ANALYZERS WHICH LOCKED ALONG THE SPIN AXIS. BOTH WERE CAFABLE OF MEASURING PROTONS OR ELECTRONS AS SELECTED BY GROUND COMMAND. ONE MEASURED PARTICLES AT 2 KEV. THE OTHER AT & KEV.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/15/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ZINC SULFIDE THIN-FILM SCINTILLATOR

NSSDC ID 71-096A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR)
PI - T.A. FRITZ NOAA BOULDER. CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF TWO SCHID-STATE DETECTORS FOR MEASURING PROTONS AND ALPHAS OVER THE RANGE 25-872 KEV. ONE TELESCOPE COVERED THE RANGE 25-300 KEV. THE OTHER 360-672 MEV.

CN 11/15/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/15/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLID-STATE DETECTORS

NSSCC ID 71-0964-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

ELECTRON INTENSITIES IN THE RANGES 35 TO 70 KEV. 70 TO 140 KEV. 140 TO 250 KEV. AND 250 TO 400 KEV WERE MONITORED BY FOUR 300-MICRON. 0.25-SQ CM SURFACE BARRIER DETECTORS.

ON 11/15/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER

NSSDC IC 71-096A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=OTHER INVESTIGATOR)
PI - L.J. CAHILL. JR. U OF MINNESCTA MINNEAFCLIS. MN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF TWO PERPENCICULAR SEARCH COIL MAGNETOMETERS. EACH MOUNTED ON A 61-CM RADIAL BOOM. THE PLANE OF CHE MAGNETOMETER WAS PERPENCICULAR TO THE SPACECRAFT SPIN AXIS, AND THE PLANE OF THE OTHER WAS PARALLEL TO THE SPACECRAFT SPIN AXIS. THIS SYSTEM MEASURED MAGNETIC FLUCTUATIONS BETWEEN 1 AND 300C HZ. THE SEARCH COIL OUTPUTS WERE ROUTED TO SETS OF FILTERS, EACH OF WHICH WAS NOMINALLY SAMPLED ONCE EACH SEC. THE EXPERIMENT FUNCTIONED NORMALLY UNTIL THE LATTER PART OF MARCH 1973 WHEN A SWITCH IN THE SPACECRAFT ANALOG MULTIPLE XER (WHICH EFFECTS ANALOG TO

DIGITAL CONVERSION) BEGAN TO FAIL. AFTER THIS TIME. THE CNLY RELIABLE DATA WERE ANALOG BROAD-BAND DATA.

ON 11/15/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACCILISITION RATE BECAME STANDARD.

ON 04/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- AC ELECTRIC FIELD MEASUREMENT

NSSDC ID 71-096A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR) IOWA CITY. IA U CF IOWA PI - D.A. GURNETT GREENEELT. MD NASA-GSFC OI - N.C. MAYMARD .

EXPERIMENT ERIEF DESCRIPTION

THE ELECTRIC FIELD ANTENNA CONSISTED OF TWO 5-1/2-IN.-CIAM METAL SPHERES MOUNTED ON THE ENDS OF TWO BOOMS WITH A 16-FT TIF-TC-TIF SEPARATION. DETERMINATION OF THE POTENTIAL DIFFERENCE BETWEEN THE SPHERES YIELDED ELECTRIC FIELDS WITH A SENSITIVITY OF 0.1 MILLIVELT/METER. SIXTEEN NARROW BAND FILTERS COVERED THE FREQUENCY RANGE 20 HZ TO 200 KHZ. THE SAME ANTENNA WAS USED IN EXPERIMENT - CE.

ON 11/15/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/01/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

SPACECRAFT COMMON NAME- HEDS 2 HEDS-A2, 05814 ALTERNATE NAMES-

NSSEC ID 72-005A

SPACECRAFT WEIGHT IN CRBIT-LAUNCH DATE- 01/31/72

117 2 KG

LAUNCH SITE- VANCENEERG AFE. UNITED STATES

LAUNCH VEHICLE- THOR-DELTA

FUNDING AGENCY ESRO INTERNATIONAL

INITIAL GREIT PARAMETERS CROIT PERIOC- 7835. MIN EPOCH DATE- 01/31/72 URBIT TYPE- GEOCENTRIC PERIAPSIS- 435.000 KM ALT INCLINATION-90.17 DEG APGAPSIS- 248161 . KM ALT

RECENT ORBIT PARAMETERS CREIT PERIOC- 7510.3 MIN EPOCH DATE- 08/15/73 ORBIT TYPE- GEOCENTRIC PERIAPSIS- 4905.32 KM ALT INCLINATION- 87.903 DEG APDAPSIS- 236429. KM ALT

SPACECRAFT PERSUNNEL (PM=PRCJECT MANAGER: FS=FRCJECT SCIENTIST) EUR SPACE TECH CENTER NOCHOWIJK, THE NETHERLANDS PS - B.G. TAYLOR

#### SPACECRAFT BRIEF DESCRIPTION

HEOS 2 WAS A SPIN-STABILIZED SPACECRAFT WITH A HIGHLY ECCENTRIC ORBIT WHOSE APOGEE OCCURRED AT HIGH LATITUDE. ITS PRIMARY SCIENTIFIC MISSIGN WAS THE INVESTIGATION OF INTERPLANETARY SPACE AND THE HIGH-LATITUDE MAGNETOSPHERE AND ITS BOUNDARY IN THE REGION ARGUAD THE NORTHERN NEUTRAL POINT. HEOS 2 PROVICED NEW DATA ON THE SOURCES AND ACCELERATION MECHANISMS OF PARTICLES WHICH ARE FOUND IN THE TRAPPED RADIATION BELTS AND IN THE POLAR PRECIPITATION REGIONS AND AURORAL ZONES. IT WONITCRED SOLAR ACTIVITY AND COSMIC RADIATION. THE SATELLITE CARRIED A MAGNETOMETER AND PARTICLE DETECTORS WHICH COVERED A BROAD RANGE FROM THERMAL TO COSMIC-RAY ENERGIES. THE SATELLITE HAD THREE ANTENNAS TO STUDY ELF WAVES AND CARRIED A SENSITIVE MICROMETEORITE DETECTOR.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER

NSSDC ID 72-005A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=CTHER INVESTIGATOR)
PI - H. ELLIOTT IMPERIAL COLLEGE LONDON, ENGLAND

# EXPERIMENT BRIEF DESCRIPTION

A THREE-AXIS FLUXGATE MAGNETOMETER WAS USED TO MEASURE MAGNETIC FIELDS OF UP TO PLUS OR MINUS 16 GAMMAS WITH A DIGITAL RESOLUTION OF PLUS OR MINUS 0.125 GAMMA. AND FROM PLUS OR MINUS 16 GAMMAS TO FLUS OR MINUS 150 GAMMAS WITH A PLUS OR MINUS 1-GAMMA RESOLUTION. CONTINUOUS FIELD SAMPLING OCCURRED AT A RATE OF ONE VECTOR PER 32 SEC. FASTER ADDITIONAL RATES ARE AVAILABLE IN A LIMITED DUTY CYCLE WHEN CORE BUFFER STORAGE IS USED. BNS NOISE MEASURMENTS FOR ONE FIELD COMPONENT IN A FREQUENCY BAND FROM 1 TO 5 HZ WERE ALSO MADE. THE INSTRUMENT WAS SIMILAR TO THAT USED FOR EXPERIMENT 68-109A-02 CARRIED ON HEOS-A1.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON AND PROTON MEASUREMENTS (20 NSSDC ID 72-005A-02 EV-50 KEV)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR)
PI - G. PIZZELLA U OF ROME ROME, ITALY
OI - A.M. BONETTI U OF FLORENCE FLORENCE, ITALY

#### EXPERIMENT BRIEF DESCRIPTION

THE DETECTOR OBSERVED ELECTRON AND PROTON DIRECTIONAL AND DIFFERENTIAL INTENSITIES IN SIX ENERGY LEVELS BETWEEN 29 EV AND 50 KEV. A SPECTRUM WAS OBTAINED IN 2.4 MIN. AN ELECTROSTATIC ANALYZER, TWO CHANNEL MULTIPLIERS. AND TWO FARADAY CUPS PERMITTED DETERMINATION OF THE BULK VELOCITY VECTOR OF THE PLASMA.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME Normal And at that time the spacecraft data acquisition rate became standard.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR VLF OBSERVATION

NESDC ID 72-005A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=(THER INVESTIGATOR) DANISH INST SPACE RSCH COPENHAGEN. DENMARK PETERS

EXPERIMENT BRIEF DESCRIPTION RADIATION AT 5 DISCRETE LOGARITHMICALLY EQUISPACED INTERVALS BETWEEN 20 AND 500 HZ WAS MEASURED USING A 1.5-SQ-M LOOP AND TWO SPHERICAL WIRE CAGE ANTENNAS. THE DYNAMIC RANGE WAS APPROXIMATELY 50 CB. THE EXPERIMENT OBJECTIVES WERE TO MEASURE VLF RADIATION IN THE SCLAR WIND AND MAGNETOSPHERE .

ON 01/31/72. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PARTICLE COUNTER TELESCOPE

NSSOC 10 72-005A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR) EUR SPACE TECH CENTER NOORDWIJK. HOLLAND. PI - D.E. PAGE

EXPERIMENT ERIEF DESCRIPTION

A TWO-ELEMENT SOLID-STATE DETECTOR TELESCOPE AND ANTICOINCIDENCE GUARD SCINTILLATOR WAS USED TO IDENTIFY UNAMBIGUOUSLY AND TO DETERMINE THE ENERGIES OF ELECTRONS. PROTONS. AND ALPHA PARTICLES IN THE RANGES 0.45 TO 3.2 MEV, 6.2 TO 33 MEV. AND 26 TO 132 MEV. RESPECTIVELY. CTHER ENERGY RANGES COULD ALSO BE MEASURED BUT WITH LESS CERTAIN IDENTIFICATION. THE GEOMETRIC FACTOR OF THE INSTRUMENT WAS 1 CM SQ STER. RATES CF 0.01 TC 10.000 PARTICLES PER SEC COULD BE MEASURED. A SPECTRUM WAS OBTAINED IN 2 PIN. INFORMATION WAS ALSO DETAINED ON THE ANGULAR DISTRIBUTIONS OF THE FLUXES.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- HIGH-ENERGY ELECTRONS

NSSDC ID 72-005A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: 01=0THER INVESTIGATOR) WILAR, ITALY U OF MILAN PI - C.O. DILWORTH GIF-SUR-YVETTE. FRANCE CEN 01 - J. LABEYRIE

EXPERIMENT BRIEF DESCRIPTION

THE FLUX AND ENERGY OF ELECTRONS IN THE RANGE 10 MEV TO 600 MEV WERE MEASURED USING A FOUR-ELEMENT TELESCOPE CONSISTING OF A GAS CERENKOV DETECTOR, A SOLIC-STATE DETECTOR, A LEAD-GLASS CERENKEV DETECTOR, AND A CAF SCINTILLATOR. THE TELESCOPE HAD A GEOMETRIC FACTOR OF APPROXIMATELY 0.4 CM SQ STER AND WAS TO DETECT AND ANALYZE ONE EVENT APPROXIMATELY EVERY 2 MIN. PULSE HEIGHT ANALYSIS WAS PERFORMED ON THE OUTPUTS FROM THE GLASS CERENKOV AND SCINTILLATOR DETECTORS. THE INSTRUMENT WAS SIMILAR TO THAT USED FOR EXPERIMENT 68-109A-07 ON HEUS-A1.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND MEASUREMENTS (230 EV-16 KEV) ASSDC ID 72-005A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - H.R. ROSENEAUER M.PLANCK INST.GARCHING GARCHING, W. GERMANY

#### EXPERIMENT BRIEF DESCRIPTION

A QUADISPERICAL ELECTROSTATIC ANALYZER WITH 11 CHANNEL MULTIPLIERS WAS USED TO STUCY THE VELOCITY DISTRIBUTION FUNCTION OF THE POSITIVE SOLAR WIND IDNS. ENERGY PER UNIT CHARGE WAS MEASURED IN 20 CHANNELS SPREAD LOGARITHMICALLY CETMEEN 230 EV AND 16 KEV. A COMPLETE SPECTFUM WAS DETERMINED EVERY 4 MIN. DETAILED INFORMATION ON THE DIRECTION OF INCIDENT PARTICLES WAS OBTAINED WITH 11 CHANNELS IN ELEVATION AND 18 CHANNELS IN AZIMUTH. A SECOND SENSOR WAS USED FOR MEASUREMENTS WITHIN THE MAGNETOSPHERE. MEASUREMENTS WERE PERFORMED IN 13 ENERGY CHANNELS COVERING THE RANGE 100 EV TO 50 KEV FOR BOTH PROTONS AND ELECTRONS. ANGULAR MEASUREMENTS WERE ALSO PERFORMED.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MICROMETEGRATO DETECTOR

NSSEC ID 72-005A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=CTHER INVESTIGATOR)
PI - H. FECHTIG M.PLANCK INST. HEIDELEG HEIDELBERG, WEST GERMANY
DI - W. GENTNER M.PLANCK INST. HEIDELEG HEIDELBERG. FORGM

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE FLUX, MASS, AND VELOCITY OF MICROMETEORO IDS AS A FUNCTION OF EARTH DISTANCE. THE INSTRUMENTATION CONSISTED OF AN ION COLLECTOR CENTERED IN A HEMISPHERICAL CONTAINER THAT WAS LOCATED IN THE OCTAGONAL-TUBE CENTER STRUCTURE OF THE SPACECRAFT. DUST PARTICLES IMPACTING ON THE HEMISPHERE CREATED SECONDARY IONS ON THE COLLECTOR. COMBINATIONS OF GRIDS HAVING VOLTAGES BETWEEN -100 V AND +300 V WERE LOCATED IN FRONT OF THE DETECTOR TO COUNTERACT ANY EFFECTS DUE TO SOLAR WIND CHARGED PARTICLES. DATA WERE OBTAINED FROM BOTH THE INTERPLANETARY REGION AND THE FIGH-LATITUDE PORTION OF THE MAGNETOSPHERE (400 TO 245,000

KM). THE EXPERIMENT WAS DESIGNED TO OPERATE FOR AT LEAST 1 YR.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- PIGNEER 10

NSSDC IC 72-012A

ALTERNATE NAMES -

PIONEER-F. PL-7230. CEE60

LAUNCH DATE- 03/03/72 SPACECRAFT WEIGHT IN CRBIT-

231. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY

UNITED STATES

NASA-0SEA

RECENT ORBIT PARAMETERS

EPOCH DATE- 03/06/73 ORBIT TYPE- GEGCENTRIC ORBIT PERIOD- 89.5 MIN PERIAPSIS- 210. KM ALT INCLINATION-65. DEG 316. KM ALT

SPACECRAFT PERSONNEL (PM=PRGJECT MANAGER, FS=FRGJECT SCIENTIST)

HALL PM - C.F. WOLFE

PS - J.H.

NASA-ARC

MOFFETT FIELD. CA

MCFFETT FIELD. CA NASA-ARC

# SPACECRAFT BRIEF DESCRIPTION

PIONEER 10 WAS THE FIRST OF TWO 231-KG, SPIN-STABILIZED. EARTH-POINTING SPACECRAFT DESIGNED TO PROVIDE INFORMATION ON THE INTERPLANETARY MEDIUM. THE ASTEROID BELT. AND THE NEAR-JUPITER ENVIRONMENT. THIS JUPITER FLYEY SPACECRAFT WAS POWERED BY A RACICISCICFE THERMCELECTRIC GENERATOR AND A EATTERY. THE SATELLITE INSTRUMENTATION WAS TO STUDY THE INTERPLANET ARY AND POSSIBLE JOVIAN MAGNETIC FIELDS. THE SOLAR WIND AND POSSIBLE JOVIAN EDW SHOCK AND MAGNETOPAUSE BOUNCARIES. SCLAR AND GALACTIC COSMIC RAYS. INTERPLANETARY CHARGED PARTICLES AND POSSIBLE JOVIAN TRAPPED RACIATION. JOVIAN THERMAL ENERGY FLUX. ZODIACAL LIGHT. ASTEROIDS AND METEOROIDS. AND INTERPLANETARY AND JOVIAN ULTRAVIOLET RADIATION. AN S-BAND OCCULTATION EXPERIMENT AND A JUPITER IMAGING AND PHOTOPOLARIZATION EXPERIMENT WERE PERFORMED. THE SPACECRAFT WAS EXPECTED TO REACH JUPITER BETWEEN 600 AND 750 DAYS AFTER LAUNCH. AFTER FLYBY. IT WAS TO HAVE A TRAJECTORY OF ESCAPE FROM THE SOLAR SYSTEM. THE CELESTIAL MECHANICS. THERMOPILE RADIOMETERS. AND S-BAND OCCULTATION EXPERIMENTS WERE IN AN. OPERATIONAL OFF MODE AS OF MARCH 15, 1973. THE SPACECRAFT APPARENTLY SUFFERED NO ILL EFFECTS IN PASSING THROUGH THE ASTEROID BELT.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID 72-012A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - E.J. SMITH . NASA-JPL PASADENA. CA - 0.5. COLPURN NASA-ARC MCFFETT FIELD, CA OI - P. DY AL NASA-ARC

MOFFETT FIELD, CA 01 - C.P. SONETT NASA-ARC POFFETT FIELD, CA 01 - P.J. COLEMAN. JR. U OF CALIFORNIA, LA LOS ANGELES. CA

GI - L. DAV IS CAL TECH PASADENA, CA DI - DAFA JONES BRIGHAM YOUNG U FREVE, UT

### EXPERIMENT BRIEF DESCRIPTION

THE MAGNETOMETER ON PIONEER 10 WAS A TRIAXIAL HELIUM MAGNETOMETER WITH SEVEN DYNAMIC FANGES. FROM PLUS OR MINUS 2.5 GAMMAS TO PLUS OR PINUS 10 GAUSS. THE LINEARITY WAS 0.1 PERCENT, AND THE NCISE THRESHOLD WAS 0.01 GAMMA RMS FOR 0-1 HZ. THE ACCURACY WAS 0.5 PERCENT OF FULL SCALE RANGE.

ON 03/03/72, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CHARGED PARTICLE COMPOSITION

NSSDC ID 72-012A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - J.A. SIMPSON U OF CHICAGO CHICAGE. IL 01 - J.J.

C' CALL AGHER U OF MARYLAND CCLLEGE FARK, MD .A - 10 TUZZOL INO

U DF CHICAGO CHICAGO, IL

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE CHARGE COMPOSITION USING THREE TYPES OF DETECTORS - (1) A SEVEN-ELEMENT SOLID-STATE DETECTOR TELESCOPE. (2) A HIGH ENERGY ELECTRON DETECTOR (EGG), AND (3) A HIGH-ENERGY PROTON DETECTOR (FISSION FOIL). THE FIRST DETECTOR WAS TO MEASURE PROTONS (450 KEV TO 150 MEV), ELECTRONS (200 KEV TO 30 MEV). AND PARTICLES FROM HE (2 = 2) TO 0 (Z = 16) (8 TO 150 MEY/NUCLEON). THE SECOND DETECTOR WAS TO MEASURE BREMSSTRAHLUNG FACTATION FROM ELECTRONS AND ELECTRONS CIRECTLY (E.GT. 9 MEV) AND IS DESIGNED TO EXCLUDE PROTONS OF ENERGIES LESS THAN 50 MEV. THE THIRD DETECTOR WAS TO MEASURE PROTONS OF ENERGIES GREATER THAN 50 MEV. THE DETECTOR SAMPLE TIME WAS TO BE SYNCHRONIZED WITH THE SPACECRAFT SPIN AND SHOULD BE 1/8 SPACECRAFT ROTATION OR ABOUT 1-1/2 SEC.

CN 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE EECAME STANDARD.

ON 03/03/72. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ASTEROID/METEDROID ASTRONOMY

NSSDC ID 72-012A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) PI - R.K. SOBERMAN GENERAL ELECTRIC CO VALLEY FERGE. PA

01 - H.A. ZOOK NASA-JSC HELSTEN, TX

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT SEARCHED FOR PARTICLES WITH MASSES LARGER THAN ABOUT ONE MICROGRAM EY OBSERVING THE SOLAR LIGHT THEY REFLECTED AND SCATTERED. FOUR INDEPENDENT TELESCOPIC SUBSYSTEMS WITH FOUR OVERLAPPING FIELDS OF VIEW WERE USED. WITH THE ENTRY AND DEPARTURE TIMES OF THE LIGHT FROM THE PARTICLES BEING USED TO DETERMINE THE RANGE AND VELCCITIES OF THE PARTICLES THEMSELVES. THE OPTICAL SUBSYSTEMS WERE COMPOSED OF 8-IN. RITCHEY-CRETAIN TELESCOPES WITH A 10-IN. FOCAL LENGTH AND A 0.2-RAD FIELD OF VIEW.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- METEOROID DETECTORS

NSSDC IC 72-012A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) HAMETCH. VA NA SA -LARC KINARC PI - W.H. HUNTSVILLE, AL NASA-MSFC 01 - R.E. TURNER LANGLEY FIELD. VA NASA-LARC ·M · L - 10 ALV AREZ LANGLEY FIELD. VA NASA-LARC HUMES 01 - D.H. LANGLEY FIELD, VA NASA-LARC O" NEAL OI - R.L.

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE NUMBER OF METEOROLD IMPACTS ON THE FIGNEER 10 SPACECRAFT BY MEANS OF 12 FANELS. EACH CONTAINING 18 PRESSURIZED CELLS. MOUNTED ON THE BACK OF THE ANTENNA DISK. THE TOTAL EXPOSED AREA WAS 0.465 M SQ. EACH PANEL OF GAS-FILLED CELLS CONSISTED OF A 1-MIL-THICK AND A 2-MIL-THICK SHEET OF STAINLESS STEEL WELDER TOGETHER IN SUCH A WAY THAT MANY SMALL POCKETS OF GAS WERE LEFT BETWEEN THEM. WHENEVER A POCKET WAS PUNCTURED. THE GAS ESCAPED AND A COLD CATHODE DEVICE DETECTED THE LOSS. THE RATE OF PRESSURE LOSS INDICATED THE SIZE OF THE HOLE WADE, AND THUS THE PARTICLE'S MASS AND INCIDENT ENERGY COULD BE DETERMINED. THE COMBINATION OF THESE DATA WITH TRAJECTORY DATA FREVIDED AN INDICATION OF THE SPATIAL DENSITY OF THE PARTICLES. THE 1-MIL-THICK SIDE OF THE GAS FANEL WAS EXPOSED TO THE INTERPLANETARY MEDIUM, AND PENETRATIONS OF THE CELLS FROM THAT SIDE INDICATED ENCOUNTERS WITH PARTICLES HAVING MASSES OF 1 NANOGRAM OR MORE. SOME 300 TO 400 HITS WERE EXPECTED BY THE TIME THE SPACECRAFT COMPLETED ITS 200-DAY JOURNEY THROUGH THE ASTEROID BELT. AFTER PIONEER 10 ENTERED THE ASTERDIC BELT BETWEEN MARS AND JUFITER CN JULY 1. 1972. THE METEOROID EXPERIMENT DETECTED UNUSUALLY LARGE NUMBERS OF METEORCIDS AND DUST PARTICLES .

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

CN 03/03/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN TRAPPED RADIATION

NSSDC ID 72-012A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CI=CTHER INVESTIGATOR)
PI - R.W. FILLIUS U OF CALIFORNIA, SD SAN DIEGO, CA
UI - C.E. MCILWAIN U OF CALIFORNIA, SD SAN DIEGO, CA

#### EXPÉRIMENT ERIEF CESCRIPTION

THIS EXPERIMENT CONSISTED OF FOUR DETECTORS. A CERENKOV COUNTER MEASURED ELECTRONS ABOVE 3, 7, AND 10 MEV. A SOLID-STATE ELECTRON SCATTER DETECTOR USED THREE DISCRIMINATION LEVELS TO MEASURE ELECTRONS BETWEEN 100 KEV AND 3 MEV. A DC SCINTILLATOR DETECTOR MEASURED THE SUM OF 25- TO 250-KEV ELECTRONS AND 800-KEV TO 250-MEV PROTONS. A SECOND SCLID-STATE DETECTOR SEPARATELY MEASURED OMNIDIRECTIONAL 60- TO 250-MEV PROTONS AND MINIMUM IONIZING PARTICLES. THE FIRST THREE DETECTORS LOOKED PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. EACH DETECTOR HAD A 30 DEG HALF-ANGLE APERATURE. AND EACH MADE EIGHT MEASUREMENTS PER SPACECRAFT SPIN PERIOD. WHILE THIS EXPERIMENT IS FRIMARILY DESIGNED FOR ENCOUNTER, DATA WERE OBTAINED AT A LOW RATE IN INTERPLANETARY SPACE.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY

NSSCC IC 72-012A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR)
PI - D.L. JUDGE USC LCS ANGELES, CA
DI - R.W. CARLSON USC LCS ANGELES, CA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, CONSISTING OF A BROADBAND PHOTOMETER SENSITIVE BETWEEN 200 AND 800 A. OBSERVED EVIDENCE OF HELIUM, WHICH IN TURN INDICATED INTERACTIONS BETWEEN CHARGED PARTICLES AND NEUTRAL HYDROGEN. DURING THE CRUISE PHASE OF THE MISSION, THIS EXPERIMENT WAS USED TO SEARCH FOR THE SUPERSONIC TO SUBSONIC TRANSITION REGION IN THE SOLAR WIND. DURING THE JOVIAN ENCOUNTER. THIS EXPERIMENT WAS USED TO LOCK FOR EVIDENCE OF AN AURORAL GVAL ON THE JOVIAN DAYSIDE. TO FIND THE RATIO OF HYDROGEN TO HELIUM IN THE JOVIAN ATMOSPHERE. AND TO FIND THE TEMPERATURE OF THE OUTER PORTION OF THE JOVIAN ATMOSPHERE.

03/03/72. THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE. THE STATUS BECAME LANDARD AT THAT TIME THE SPACECRAFT DATA ACQUISITION FATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- IMAGING PHOTO POLARIMETER

NSSEC ID 72-012A-07

EXPERIMENT PERSONNEL (PI = PRINCIPAL INVESTIGATOR, 01 = CTHEF INVESTIGATOR) U OF ARIZONA PI - T. GEHRELS TUCSEN. AZ 01 - J.L. ALEANY, NY WEINBERG CUDLEY CBS GI - D.L. COFFEEN U OF ARIZONA TUCSON, AZ U OF ARIZCHA HAMEEN-ANTILLA 01 - J. TUCSON: AZ 01 ~ C.E. KENKNIGHT U OF ARIZONA TUCSCN. AZ

SANTA BARBARA RSCH CEN SANTA BARBARA, CA

HUMMER GI - R.F.

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A PCINTABLE 1-IN. MAKSUTOV TELESCOPE EQUIPPED WITH TWO COLOR DETECTORS (RED. 5800 TO 7000 A. AND ELUE, 3900 TO 4900 A) AND A POLARIZATION MEASURING CAPABILITY. THE FIELD OF VIEW COULD BE SELECTED FOR ZOCIACAL LIGHT STUDIES (32 X 40 MILLIRAD), FHOTOFOLARIMETRY (8 X 8 OR 12 X 12 MILLIRAD), OR IMAGING (0.5 X C.5 MILLIRAD). DURING THE CRUISE PORTION OF THE MISSION THIS EXPERIMENT WAS USED TO CHERVE ZOCIACAL LIGHT TO ASSESS THE QUANTITY AND DISTRIBUTION OF PARTICULATE MATTER IN INTERPLANETARY SPACE. UPON APPROACHING JUPITER. THIS EXPERIMENT WAS USED FOR PHOTOMETRIC AND POLARIZATION STUDIES OF JUPITER AND ONE OR MORE OF ITS SATELLITES. DURING JUVIAN ENCOUNTER. THE EXPERIMENT WOLLD TAKE ADVANTAGE OF THE SPACECRAFT SPIN IN ORDER TO MAKE TWO COLOR THAGES OF JUSTITES WITH A RESOLUTION OF 200 KM ON THE JOVIAN SURFACE.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INFRARED RADIOMETERS

NSSDC ID 72-012A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PASADENA, CA CAL TECH MUNCH PI - G. PASADENA, CA CAL TECH NEU GE E AU ER CI - G.

01 - S.C. CHASE, JR. SANTA BARBARA RSCH CEN GOLETA, CA

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE IRRADIANCE OF JUDITER'S ATMOSPHERE AND SURFACE IN TWO RANGES OF THERNAL (IR) WAVELENGTHS -- 14 TO 25 MICRONS AND 19 TO 56 MICRONS. THESE MEASUREMENTS FROVIDED DATA ON THE NET THERMAL ENERGY FLUX OF JUPITER AND ITS DEVIATION FROM A ELACKBEDY SPECTRUM. IN ADDITION. DETAILED INFORMATION WAS PROVIDED ON THE ATMOSPHERIC THERMAL STRUCTURE AND CHEMICAL COMPOSITION OF THE PLANET. THE INSTRUMENTATION FOR THIS EXPERIMENT WAS SIMILAR TO THAT CARRIED ON THE MARINER MARS 1969 FLIGHTS BUT HAD HIGHER RESOLUTION. IT WAS A TWO-CHANNEL IR RADIOMETER EMPLOYING A PAIR OF 88-CHANNEL, THIN-FILM BIMETALLIC THERMOCOUPLES, ILLUMINATED THROUGH APPROPRIATE OPTICS BY A 7.62-CM REFLECTING CASSEGRAIN TELESCOPE WITH A 1-DEG BY 0.3-DEG FIELD OF VIEW. ANALYSIS OF THE DATA WAS TO HELP RESOLVE -- (1) WHETHER JUPITER IS RACIATING A SIGNIFICANT AMOUNT OF INTERNAL ENERGY, (2) THE EXISTENCE OF A FROZEN METHANE POLAR CAP. (3) THE BRIGHTNESS TEMPERATURE UN THE DARK HEMISPHERE, AND (4) THE EXISTENCE OF THERMAL DISCONTINUITIES IN THE ATMOSPHERE.

CN 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NURMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME ZERO.

EXPERIMENT NAME- CELESTIAL MECHANICS

NSSCC ID 72-0124-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) PI - J.D. ANDERSON PASADENA, CA. NASA-JPL

OI - G.W. NULL

NASA-JPL

FASADENA, CA

#### EXPERIMENT BRIEF DESCRIPTION

TWO-WAY DOPPLER TRACKING OF THE SPACECRAFT WAS USED TO MAKE MORE PRECISE DETERMINATIONS OF PLANETARY MASSES. THE HELIOCENTRIC ORBIT OF JUPITER, AND THE GRAVITATIONAL FIELDS OF THE SUN, JUPITER, AND THE GALILEAN SATELLITES.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- S-BAND OCCULTATION

NSSCC IC 72-012A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - A.J. KLIDRE NA-SA-JPL PASADENA. CA 81 - G. FJELDBC NA SA - JPL FASADENA, CA OI - D.L. CATN NASA-JPL PASADENA. CA 01 - B.L. SEIDEL NASA-GISS NEW YCEK. NY or - s.r. RASCOL NASA HEADQUARTERS WASHINGTON, DC

### EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT UTILIZED RADIO REFRACTION EFFECTS ON THE SPACECRAFT'S BAND RADIO SIGNAL TO DETERMINE THE VERTICAL DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES IN THE JOVIAN ATMOSPHERE.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION FATE BECAME STANDARD.

ON 03/03/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN CHARGED PARTICLES EXPERIMENT

NSSCC IC 72-012A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR) PI - J.A. VAN ALLEN U OF TOWA IGWA CITY. IA

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE PARTICLES IN THE VICINITY OF JUPITER USING THREE SETS OF DETECTORS -- (1) A THREE-ELEMENT GEIGER TUBE TELESCOPE. (2) A THREE-ELEMENT TRIANGULAR ARRAY OF DETECTORS. AND (3) A LOW-ENERGY GEIGER TUBE DETECTOR. THE FIRST DETECTOR IS TO MEASURE ELECTRONS (E.GT. 2 MEV) AND PROTONS (E.GT. 10 MEV). THE SECOND IS TO MEASURE ELECTRONS (E.GT. 10 MEV). AND THE THIRD IS ALSO TO MEASURE ELECTRONS (E.GT. 50 KEV). THE DETECTOR SANFLE TIME IS TO BE SYNCHRONIZED WITH THE SPACECRAFT TELEMETRY SYSTEM AND WOULD DEPEND UPON THE TELEMETRY BIT RATE, . I.E. , THE SAMPLE TIME MAY RANGE FROM 3/32 SEC TO 12 SEC.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC-RAY SPECTRA

NSSCC ID 72-012A-12

EXPERIMENT PI - F.8. OI - K.G. DI - W.R. OI - E.C. OI - J.H. OI - 8.J.	PERSONNEL MCDONALD MCCRACKEN WEBBER ROELOF TRAINOR TEEGARDEN	(PI=PRINCIPAL INVESTIGATOR, CI=CT NASA-GSFC U DF ADELAIDE U DF NEW HAMPSHIRE U DF NEW HAMPSHIRE NASA-GSFC NASA-GSFC	FER INVESTIGATOR) GREENBELT. MD ADELAIDE. AUSTRALIA DURHAM. NH DURHAM. NH GREENBELT. MD GREENEELT. MC
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#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF THREE MULTIELEMENT SOLID-STATE TELESCOPES. ALL LOOKING NORMAL TO THE SPACECRAFT SFIN AXIS. THE HIGH-ENERGY TELESCOPE (HET) CONSISTED OF FIVE COLINEAR SENSORS AND MEASURED STOPPING PARTICLES (Z = 1 TO 8) IN THE ENERGY RANGE 20 TC 50 MEV/NUCLEON AND PENETRATING PARTICLES IN THE RANGE 50 TO 800 MEV/NUCLECH. CHARGE RESCLUTION FOR PENETRATING PARTICLES WAS POSSIBLE UP TO 200 MEY/NUCLEGN. THE FIRST LOW-ENERGY TELESCOPE (LET-I) HAD FOUR ELEMENTS AND MEASURED STOPPING Z=1TO 8 PARTICLES IN THE ENERGY RANGE 3 TO 32 MEV/NUCLEON. THE SECOND LOW-ENERGY TELESCOPE (LET-II) HAD THREE ELEMENTS AND MEASURED STCPPING ELECTRONS BETWEEN 50 AND 1000 KEV AND STOPPING PROTONS BETWEEN 50 KEV AND 20 MEV. FOR EACH TELESCOPE. COUNT RATES WERE OBTAINED FOR EACH OF SEVERAL SENSOR COINCIDENCE-ANTICOINCIDENCE MODES. SOME OF THE RATES FROM EACH TELES COPE WERE SECTORED INTO EIGHT OCTANTS IN THE SPACECRAFT SPIN PLANE. IN ADDITION, THREE-SENSOR PULSE HEIGHT ANALYSIS. WITH FRICEITY SCHEMES FAVORING THE ANALYSIS OF HEAVIER PARTICLES, WAS ASSOCIATED WITH EACH TELESCOPE.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/02/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PLASMA EXPERIMENT

NSSDC ID 72-012A-13

EXPERIMENT PERSONNEL (PI=PRINCI PI - J.H. WOLFE OI - L.A. FRANK OI - R. LUST OI - D.S. INTRILIGATOR OI - D.D. MCKIBBIN OI - V.T. ZAVIENTSEFF OI - F.L. SCARF OI - H.R. COLLARD OI - W.C. FELDMAN	PAL INVESTIGATOR. GI=OTH NASA+ARC U OF IDWA M.PLANCK INST.GARCHING USC NASA+ARC NASA-ARC TRB SYSTEMS GROUP NASA-ARC NASA-ARC NASA-ARC	MOFFETT FIELD, CA IOWA CITY, IA
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EXPERIMENT BRIEF DESCRIPTION

TWO QUADRISPHERICAL ELECTROSTATIC ANALYZERS WERE USED TO STUDY THE DIRECTIONAL INTENSITY OF SOLAR WIND IONS AND ELECTRONS. THE DETECTORS WERE USED TO OBSERVE A POSSIBLE JOVIAN BOW SHOCK. MAGNETOSHEATH. AND MAGNETOPAUSE. THE INSTRUMENTS STUDIED POSITIVE IONS IN 32 ENERGY/CHARGE STEPS BETWEEN 1CC V AND 18 KV. AND ELECTRONS IN 16 STEPS EETWEEN 100 V AND 18 KV.

ON 03/03/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMEN NAME-ITC 1A ALTERNATE NAMES- PL-721E, TD 1, 05879

NSSOC ID 72-014A

LAUNCH DATE- 03/12/72

SPACECRAFT WEIGHT IN GRBIT-

A79. VC

LAUNCH SITE- VANCENBERG AFB, UNITED STATES

LAUNCH VEHICLE- TA DELTA

FUNDING AGENCY

INTERNATIONAL

E SRO

INITIAL ORBIT PARAMETERS

EPOCH DATE- 03/12/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.291 MIN APGAPSIS- 541.9 KM ALT PERIAPSIS- 523.43 KM ALT INCLINATION- 97.555 DEG

RECENT ORBIT PARAMETERS

EPUCH DATE- 09/05/73 OREIT TYPE- GENCENTRIC CRBIT FERICO- 95.141 MIN APUAPSIS- 535.90 KM ALT PERIAPSIS- 525.15 KM ALT INCLINATION- 97.569 DEG

SPACECRAFT PERSONNEL (PM=PRGJECT MANAGER, PS=FRGJECT SCIENTIST)

# SPACECRAFT BRIEF DESCRIPTION

THE TO-1 SPACECRAFT WAS ESSENTIALLY COMPOSED OF TWO BOXES. THE UPPER BOX CONTAINED THE EXPERIMENTS AND THE LOWER BOX CONTAINED THE SPACECRAFT EQUIPMENT. THE EXPERIMENT COMPARTMENT WAS BUILT AROUND THE TWO LARGE TELESCOPES (28 AND 30 CM IN DIAM) AND THE SPARK CHAMBER. THE SPACECRAFT WAS SOLAR POWERED. AND CURING THE SUNLIT PHASE OF ITS CREIT WAS ATTITUDE CONTROLLED TO AEGUT 1 MIN OF ARC. ONE AXIS WAS POINTED TO WITHIN ONE ARC-MIN OF THE SUN, AND ANOTHER AXIS LAY WITHIN 0.5 DEG CF THE PLANE OF THE SUN. EARTH, AND SPACECRAFT (I.E., THE SPACECRAFT Z AXIS ALWAYS PCINTED TOWARDS THE EARTH). BOTH TAPE RECORDERS FAILED WITHIN THE MENTHS OF LAUNCH, CAUSING DATA RECOVERY TO DROP FROM 95 PERCENT TO LESS THAN 25 PERCENT. IN OCTOBER 1972. THE SPACECRAFT WAS PLACED IN HIBERNATION FOR ACCUT FOUR MONTHS SINCE IT COULD NOT WITHSTAND, FOR ANY LENGTH, PERICOS OF SPACECRAFT NIGHT WHILE IN ACTIVE USE. IN FEBRUARY 1973 THE SPACECRAFT WAS SUCCESSFULLY REACTIVATED AND REAL-TIME TELEMETRY COVERAGE WAS INCREASED TO ABOUT TO PERCENT. THE COSMIC X-RAY SPECTROMETER EXPERIMENT (S-77) CAUSED ABNORMAL READCUTS IN THE HOUSEKEEPING TELEMETRY CHANNELS. AND HENCE WAS NOT OPERATED UNTIL JULY. 1973.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME

AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD. NORMAL

EXPERIMENT NAME- STELLAR UV RADIATION EXPERIMENT

NSSDC ID 72-014A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) LIEGE, EELGIUM U OF MONS HQUZ I AU X PI - L.N.

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A 1.4-M TELESCOPE WITH A SPECTROMETER BOX ATTACHED TO IT. AN GFF-AXIS PARABOLOID MIRROR (F/3.5, DIAN 275 MM) REFLECTED STARLIGHT ONTO A SYSTEM OF TWO SLITS SITUATED IN THE PRIME FOCAL PLANE. ONE OF THE TWO SLITS FED THE STELLAR LIGHT INTO A SINGLE PHOTOMETRIC CHANNEL WITH A FILTER LIMITING THE PASSBAND TO 4CC A CENTERED AT 2750 A. THE CTHER SLIT WAS MUCH WIDER (11.9 X 17 ARC-MIN), AND LED INTO THE THREE-CHANNEL GRATING SPECTROMETER. ONCE PER ORBIT, THE TELESCOPE, ALIGNED ALONG THE Z AXIS. SCANNED A GREAT CIRCLE OF THE SKY. BECAUSE OF THIS MOTION ACROSS THE SKY. THE PRIMARY IMAGE OF A CERTAIN STAR ENTERING THE TELESCOPE'S FIELD CF VIEW MOVED ACRESS THE PHOTOMETER AND SPECTROPHOTOMETER SLOTS. WHILE THE STAR IMAGE TRAVERSED THE WIDE SPECTROPHOTOMETER SLCT. ITS CORRESPONDING SPECTRUM MOVED IN THE FOCAL PLANE OF THE SPECTROGRAPH ACROSS THE THREE EXIT SLITS. BEHIND WHICH THERE WERE THREE PULSE-COUNTING PHOTOMULTIPLIERS. BY EMPLOYING THE SCANNING MOTION OF THE SATELLITE. A SPECTRUM SCANNING ACTION WAS ACHIEVED WITHOUT THE NEED FOR MOVING PARTS. THE THREE EXIT SLITS OF THE SPECTROPHOTOMETER WERE FIXED AT THE FOLLOWING WAVELENGTHS -- 1350 TO 1760 A. 1760 TO 2160 A AND 2150 TO 2550 A. THE WAVELENGTH REGION FROM 1350 TO 2550 A . WAS FULLY COVERED BY THE THREE CHANNELS IN 3.3 SEC. YIELDING A TOTAL OF ABOUT 60 DATA PCINTS. IN EACH CHANNEL THE SPECTRUM WAS SCANNED AT 19.4-A INTERVALS. THE EFFECTIVE PASSBAND DURING EACH INTEGRATION INTERVAL HAVING A FULL-WIOTH HALF-MAXIMUM OF 35 TO 40 A. JUST BEFORE THE TELESCOPE WAS INTEGRATED INTO THE SATELLITE, THE INSTRUMENT WAS EXTENSIVELY CALIBRATED IN DRDER TO ACHIEVE AN ABSOLUTE PHOTOMETRIC ACCURACY BETWEEN 10 AND 20 PERCENT. A RELATIVE PHOTOMETRIC ACCURACY WITHIN 10 PERCENT AND A WAVELENGTH CALIBRATION ACCURATE TO A FEW ANGSTROMS. THIS EXPERIMENT WAS TO DETECT 20,000 STARS, OF WHICH 6000 SHOULD HAVE GIVEN USEFUL UV SPECTRA. IT WAS ABLE TO MEASURE STARS OF MAGNITUDE 10.5. TWO MAJOR OBJECTIVES WERE THE STUDY OF INTERSTELLAR EXTINCTION AND THE PREPARATION OF A LV STAR CATALOG.

CN 02/14/73, THE CATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- UV STELLAR SPECTROMETER

NSSDC ID 72-014A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=OTHER INVESTIGATOR)

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT CONSISTED OF A CASSEGRAIN TELESCOPE (PRIMARY MIRROR 26 CM IN DIAM) AND A GRATING SPECTROMETER WHICH CPERATED IN THREE PASSBANDS (2260 TO 2155 A. 2455 TO 2590 A. AND 2775 TO 2865 A). WHEN A STAR OF SUFFICIENT BRIGHTNESS APPEARED IN THE TELESCOPE. THE TELESCOPE LOCKED ONTO IT WITH A SELF-CONTAINED GUIDANCE SYSTEM AND THEN SCANNED THREE 100-A PASSBANDS IN 0.5 A INCREMENTS WITH AN OVERALL ACCURACY OF 1 A AND SPECTRAL

### RESOLUTION OF 1.8 A.

DN 02/14/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SPECTROMETRY OF PRIMARY CHARGED
PARTICLES

NSSDC ID 72-014A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTER INVESTIGATOR)
PI + J. LABEYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED THE CHARGE SPECTRUM OF PRIMARY COSMIC RAYS BY USING A CHARGED PARTICLE TELESCOPE AND CDINCIDENCE TECHNIQUES. THE TELESCOPE WAS MOUNTED ALONG THE MAIN AXIS OF THE SATELLITE, WHICH WAS ALWAYS POINTED TUWARD THE CENTER OF THE SUN.

ON 02/14/73, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

CN 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SPECTROMETRY OF EXTRATERRESTRIAL X RAYS NSSDC IC 72-014A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=QTHER INVESTIGATOR)
PI - J. LABEYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT ERIEF DESCRIPTION

A 100-SQ-CM PRUPORTIONAL COUNTER WAS USED TO MEASURE THE SPECTRA OF CDSMIC X-RAY SQUECES IN 10 CHANNELS BETWEEN 3 AND 30 KEV. THE PROPERTIONAL COUNTER WAS LOCATED BEHIND A CROSSED PAIR OF SLOT COLLIMATORS WHICH TOGETHER YIELDED A 5- BY 1- DEG FIELD OF VIEW. THE PROPERTIONAL COUNTER HAD A 0.5-MM BERYLLIUM WINDOW AND A XENON FILLER GAS. IT WAS CONSTRUCTED IN TWO PARTS. WHICH WERE THEN ANTICOINCIDENCED TO REMOVE THE BACKGROUND DUE TO COSMIC-RAY PARTICLES. DUE TO OPERATIONAL DIFFICULTIES. THIS EXFERIMENT WAS TURNED OFF SDON AFTER IT WAS TURNED ON. AND WAS NOT TURNED ON AGAIN UNTIL JULY 2, 1973.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 07/02/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME - SOLAR GAMMA RAYS IN THE 50- TO 500-MEV NSSCO ID 72-0144-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI + G. DCCHIALINI U OF MILAN MILAN, ITALY

### EXPERIMENT BRIEF DESCRIPTION

A COMBINATION OF SCINTILLATORS AND PHOTENULTIFLIERS WERE USED TO DETECT SOLAR GAMMA RAYS (PHOTON ENERGY .LT. SC AND .GT. 500 MEV) WHILE DISCRIMINATING AGAINST CHARGED PARTICLES. A DIRECTIONAL ACCURACY OF A FEW DEG WAS ACHIEVED. THE EFFECTIVE AREA OF 100 SQ CM ALLOWED A EACKGROUND OF 10 TO THE -5 PHOTONS/SC CM-SEC TO BE OBTAINED WHILE THE DYNAMIC RANGE ALLOWED FLUXES UP TG 10 TO THE -2 TG BE MEASURED DURING SCLAR FLARES.

CN 02/14/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/75, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SCLAR X-RAY MONITOR

NSSDC ID 72-014A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - C. DE JAGER UTRECHT U UTRECHT, NETHERLANDS

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT CREEVED HARD X RAYS EMITTED BY THE SUN. DIVIDING PULSES OBTAINED FROM A CESIUM INDIDE (CSI) CRYSTAL INTO 12 LOGARITHMICALLY EQUISPACED ENERGY INTERVALS BETWEEN 24 AND 900 KEV. THE EXPERIMENT TOOK ADVANTAGE OF THE CONTINUOUS SUN POINTING. A TIME FESOLUTION OF 1.2 SEC WAS ACHIEVED FOR THE FOUR CHANNELS BETWEEN 24 AND 90 KEV. THE RESOLUTION WAS 4.8 SEC FOR THE OTHER CHANNELS.

ON 02/14/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQLISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- GAMMA-RAY MEASUREMENT

NESCC IC 72-014A-07

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - J. LABSYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT EPIEF DESCRIPTION

AN OPTICAL SPARK CHAMBER WITH COUNTERS AND A VIDICON SYSTEM WAS USED TO MEASURE GAMMA RAYS IN THE 70- TO 300-MEV ENERGY RANGE. THE SENSITIVE AREA OF THE DETECTOR WAS 200 SQ CM. AND THE EFFICIENCY FCF GAMMA RAYS WAS 16 PERCENT. ALL OF THE SKY WAS SCANNED IN 6 MONTHS WITH A SENSITIVITY CAPABLE OF DETECTING A FLUX OF GREATER THAN 10 TC THE -6 PHOTONS/SQ CM-SEC.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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SPACE CRAFT COMMON NAME - APOLLO 15 LM/ALSEP NSSDC 10 72-031C ALTERNATE NAMES - ALSEP 16. LEM 16. ROVER 16. 06005. APOLLO 16C

LAUNCH DATE- 04/16/72 SPACECRAFT WEIGHT IN CREIT- 16400. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY
UNITED STATES

NASA-DMSE

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

### SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 16 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV). AND AN AFOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE DESCARTES HIGHLAND REGION JUST NORTH OF THE CRATER DOLLAND AT 8 DEG 59 MIN 55 SEC S LATITUDE, AND 15 DEG 31 MIN 12 SEC E LONGITUDE. THE ALSEP WAS DEPLOYED AT THE LANCING SITE. THE LRV WAS USED DURING EXTRA VEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXFLORATION. THE NUCLEAR POWERED ALSEP PACKAGE CONTAINED SEISMIC, MAGNETIC FIELD, HEAT FLOW. LUNAR SOIL COMPOSITION. SOLAR WIND. AND COSMIC-RAY EXPERIMENTS.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID 72-031C-01

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR)  $PI \sim G \cdot V \cdot LATHAM$  U of TEXAS GALVESTON. TX

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PASSIVE SEISMIC EXPERIMENT (PSE) (5-031). WHICH WAS PART OF THE ALSEP. WAS TO MEASURE SEISMIC SIGNALS FROM ALL EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE DATA FROM THIS EXPERIMENT WILL SE USED TO DETERMINE THE INTERNAL LUNAR STRUCTURE, RATE OF ENERGY RELEASE. AND NUMBERS AND MASSES OF IMPACTING METECRS. THIS EXPERIMENT USED THE DATA FROM EXPERIMENTS ON THE IMPACTS OF THE S-IV 8 AND LW ASCENT STAGES AS EXTERNAL CALIBRATION SOURCES. THE INSTRUMENT PACKAGE REPRESENTED THE FOURTH ACTIVE INSTRUMENT AVAILABLE IN THE LUNAR SEISMIC NETWORK AND WILL ENABLE SCIENTISTS TO LOCATE REGIONS OF SEISMIC ACTIVITY NORE PRECISELY . THE INSTRUMENT PACKAGE WAS CUMPOSED OF TWO ASSEMBLIES -- (1) A LONG-PERIOD. TRIAXIAL, ORTHOGONAL SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80 D8) DYNAMICAL RANGE AND (2) A SHORT-PERICD. UNIAXIAL. VERTICAL MOTION SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.05 TO 20 HZ (80-08) DYNAMICAL RANGE AND THE MINIMUM DETECTABLE SIGNALS CN 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE INSTRUMENT PACKAGE WAS CABLE-CONNECTED TO THE CENTRAL ALSEP POWER STATION WHICH WAS DEPLOYED BY THE ASTRONAUTS.

UN 04/21/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE: THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/21/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME - ACTIVE SEISMIC

NSSCC 1D 72-031C-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI + R.L. KOVACH STANFORD L STANFORD, CA

# EXPERIMENT ERIEF DESCRIPTION

THE PURPOSE OF THE ACTIVE SEISMIC EXPERIMENT (ASE) (5-033) WAS TO ACQUIRE DATA TO DETERMINE THE PHYSICAL PROPERTIES OF THE LUNAR SURFACE AND SUBSURFACE MATERIALS. BOTH NATURAL AND ARTIFICIALLY PRODUCED SEISMIC WAVES WERE MONITORED. THE ARTIFICIAL WAVES WERE PRODUCED BY SHOTGUN-LIKE CHARGES FIRED BY A "THUMPER" DEVICE AND EXPLOSIVE GRENADE CHARGES FIRED FROM A MCRTAR BOX ASSEMBLY BY AN ASTRONAUT. THE EQUIPMENT CONSISTED OF A THUMPER/GEOPHONE ASSEMBLY. A MORTAR PACKAGE ASSEMBLY, INTERCONNECTING CABLES. AND AN ELECTRONICS ASSEMBLY HOUSED IN THE CENTRAL STATION. THE ASE GENERATED AND MCNITCRED SEISMIC WAVES IN THE RANGE 3 TO 250 HZ WITH A FREQUENCY RESPONSE OF PLUS OR MINUS 3 DE IN THE FREQUENCY RANGE OF 3 TO 100 HZ. NATURAL SEISMIC WAVES WERE ALSO MONITORED WITHIN THIS RANGE WHILE THE ALSEP STATION WAS DECRATING IN THE ASE MODE. THE DATA-GATHERING INTERVAL WAS SMALL BECAUSE THE CENTRAL STATION OPERATED IN THE ASE MODE ON THE AVERAGE OF ONLY 30 MIN/WEEK. THE THUMPER CONTAINED 21 STANDARD INITIATORS MOUNTED PERPENDICULAR TO ITS BASE PLATE, WHICH WAS SELECTED AND FIXED BY AN ASTRUNAUT. THE THUMPER WAS CABLE-CONNECTED TO THE CENTRAL STATION AND WAS FIRED AT INTERVALS OF 5 M. THUMPER FIRINGS BEYOND AFFROXIMATELY 40 M PRODUCED WEAK SIGNALS. ONE P-WAVE VELOCITY OF 114 M/SEC WAS MEASURED. THE GEOFHUNES WERE ELECTROMAGNETIC LISTENING DEVICES THAT WERE CARLE-CONNECTED TO THE CENTRAL STATION, WHERE THEY WERE AMPLIFIED, DIGITIZED, AND TRANSMITTED TO EARTH. THEY WERE PLACED AT DISTANCES OF 3. 43. AND 93 M FROM THE CENTRAL STATION. THE MORTAR BOX GRENADES WERE ROCKET-LAUNCHED BY EARTH CUMMAND. THEY INFACTED AT RANGES OF APPROXIMATELY 150. 300. AND 900 M FROM THE DEPLOYED MORTAR BOX ASSEMBLY. THE DECISION NOT TO LAUNCH GRENADE NO. 1 (1500 M) WAS MALE BECAUSE THE LAUNCH ASSEMBLY PITCH-ANGLE SENSOR WENT OFF-S CALE HIGH. MAKING THE PITCH POSITION OF THE ASSEMBLY UNCERTAIN.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- ERTS 1 NSSCC ID 72-058A ALTERNATE NAMES- EARTH RES. TECH SAT.-A. PL-724A, EFTS-A. 06126

LAUNCH DATE- 07/23/72 SPACECRAFT WEIGHT IN ORBIT- 816. KG

LAUNCH SITE- VANDENBERG AFB. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NASA-USSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 07/23/72 ORBIT TYPE- GEOCENTRIC CRBIT PERICD- 103.2 MIN APD APS IS - 912.000 KM ALT PERIAPSIS - 912.000 KM ALT INCLINATION - 99.125 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/05/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 103.15 MIN APDAPSIS- 914.37 KM ALT PERIAPSIS- 900.80 KM ALT INCLINATION- 99.062 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PN - S. WEILAND PS - W.P. NORDBERGO NASA-GSFC · NASA-GSFC

GREENBELT. MD

GREENBELT. MD

SPACECRAFT BRIEF, DESCRIPTION

THE EARTH RESOURCES TECHNOLOGY SATELLITE (ERTS) 1 WAS A MCDIFIED VERSION OF THE NIMBUS 4 METEOROLOGICAL SATELLITE. THE NEAR-FOLAR ORBITING SPACECRAFT WAS DESIGNED TO SERVE AS A STABILIZED. EARTH-OFIENTED PLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL AND FORESTRY RESOURCES, GEOLOGY AND MINERAL RESOURCES. HYDROLOGY AND WATER RESOURCES, GEOGRAPHY. CARTOGRAPHY, ENVIRONMENTAL POLLUTION, OCEANOGRAPHY AND MARINE RESOURCES. AND METEUROLOGICAL FRENOMENA. TO ACCOMPLISH THESE OBJECTIVES. THE SPACECRAFT WAS EQUIPPED WITH (1) A FOUR-CHANNEL MULTISPECTRAL SCANNER (MSS) AND A THREE-GAMERA RETURN BEAM VIDICON (RBV) TO OBTAIN BOTH VISIBLE AND INFRARED PHOTOGRAPHIC AND RADIOMETRIC IMAGES OF THE EARTH AND (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE, INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS. ERTS 1 CARRIED TWO WIDE-BAND VIDED TAPE RECORDERS (MBVTR.) CAPABLE OF STORING UP TO 30 MIN OF SCANNER OR CAMERA DATA TO GIVE THE SPACECRAFT'S SENSORS A NEAR-GLOBAL COVERAGE CAPABILITY. AN ADVANCED ATTITUDE CONTROL SYSTEM CONSISTING OF HORIZON SCANNERS, SUN SENSORS, AND A COMMAND ANTENNA COMBINED WITH A FREON GAS PROPULSION SYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 0.7 DEG IN ALL THREE AXES. SPACECRAFT COMMUNICATIONS INCLUDED A COMMAND SUBSYSTEM OPERATING AT 154.2 AND 2106.4 MHZ AND A PULSE CODE MODULATED (PCM) NARROW-BAND TELEMETRY SUBSYSTEM. OPERATING AT 2287.5 AND 137.86 MHZ. FOR SFACECRAFT HOUSEKEEPING, ATTITUDE. AND SENSOR PERFORMANCE DATA, VIDEO DATA FROM THE THREE-CAMERA REV SYSTEM WAS TRANSMITTED IN BOTH REAL-TIME AND TAPE RECORDER MODES AT 2265.5 MHZ, WHILE INFORMATION FROM THE MSS WAS CONSTRAINED TO A 20-MHZ RF BANDWIDTH AT 2229.5 MHZ. THE RBV WAS TURNED OFF 2 WEEKS AFTER LAUNCH WHEN AN EXCESSIVE POWER DRAIN WAS OBSERVED IN THE SPACECRAFT ELECTRICAL SYSTEM. ONE MOVTR IS ALSO INOPERABLE.

ON 07/23/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- RETURN BEAM VIDICON (RBV) CAMERA SYSTEM NSSDC ID 72-058A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR) PI - 0. WEINSTEIN NASA-GSFC GREENBELT. MD

.M.T - 10 RAGLAND

NASA-GSEC

GREENEELT. NO

#### EXPERIMENT BRIEF DESCRIPTION

THE ERTS 1 RETURN BEAM VIDICON (RBV) CAMERA SYSTEM CONTAINED THREE INDEPENDENT CAMERAS COVERING THE THREE SPECTRAL BANDS FROM ELUE-GREEN (0.47 TO 0.575 MICRON) THROUGH YELLOW-RED (0.58 TO 0.68 MICRON) TO NEAR INFRARED (0.69 TO 0.83 MICRON). WHILE DESIGNED PRIMARILY TO CHTAIN INFORMATION FOR EARTH RESOURCE TYPE STUDIES. THE RBV CAMERA SYSTEM WAS ALSO USED TO CONDUCT METEOROLOGICAL STUDIES. I.E., TO INVESTIGATE ATMOSPHERIC ATTENUATION AND TO OBSERVE MESOSCALE PHENOMENA. WINTER MONSECH CLOUDS (JAPAN). SHOW COVER. ETC. THE THREE EARTH-CRIENTED CAMERAS WERE MOUNTED TO A COMMON BASE, WHICH WAS STRUCTURALLY ISOLATED FROM THE SPACECRAFT TO MAINTAIN ACCURATE ALIGNMENT. EACH CAMERA CONTAINED AN OPTICAL LENS. A 5.08-CM FETURE BEAM VIDICON. A THERMOELECTRIC COOLER. DEFLECTION AND FOCUS COILS. A MECHANICAL SHUTTER. ERASE LAMPS. AND SENSOR ELECTRONICS. THE CAMERAS WERE SIMILAR EXCEPT FOR THE SPECTRAL FILTERS CONTAINED IN THE LENS ASSEMBLIES THAT PROVIDED SEPARATE SPECTRAL VIEWING REGIONS. THE VIEWED GROUND SCENE, 185 BY 185 KM IN AREA. WAS STORED ON THE PHOTOSENSITIVE SURFACE OF THE CAMERA TUEE, AND. AFTER SHUTTERING. THE IMAGE WAS SCANNED BY AN ELECTRON BEAM TO PRODUCE A VIDEO SIGNAL OUTPUT. EACH CAMERA WAS READ OUT SEQUENTIALLY. REGUIRING ABOUT 3.5 SEC FOR EACH OF THE SPECTRAL IMAGES. THE CAMERAS WERE RESHUTTERED EVERY 25 SEC TO PRODUCE CVERLAPPING IMAGES ALONG THE DIRECTION OF SPACECRAFT MOTION. VIDEO DATA FROM THE RBV WERE TRANSMITTED (2265.5 MHZ) IN BOTH REAL-TIME AND TAPE RECORDER MODES. FROM A NOMINAL SPACECRAFT ALTITUDE OF 900 KM. THE ROV HAD A HORIZONTAL RESOLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT ARE HANDLED BY THE NASA DATA PROCESSING FACILITY. GSFC. GREENBELT, MD.. AND ARE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED PERSONS MAY COTAIN DATA FROM THE EARTH RESOURCES DATA CENTER. DEPARTMENT OF THE INTERIOR. SIOUX FALLS. 5.0. THE REV PERFORMED NORMALLY AFTER LAUNCH BUT WAS PLACED OPERATIONALLY OFF ON AUGUST 6, 1972. WHEN AN EXCESSIVE POWER DRAIN OCCURRED IN THE SPACECRAFT ELECTRICAL SYSTEM.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME AND AT THAT TIME THE EXPERIMENT DATA ACQLISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MULTISPECTRAL SCANNER (MSS)

NSSDC ID 72-058A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR; CI=CTHER INVESTIGATOR) PI - UNKNOWN UNKNOWN

### EXPERIMENT BRIEF DESCRIPTION

THE ERTS 1 MULTISPECTRAL SCANNER (MSS) WAS DESIGNED TO PROVIDE REPETITIVE DAYTIME ACQUISITION OF HIGH-RESOLUTION. MULTISPECTRAL DATA OF THE EARTH'S SURFACE ON A GLOBAL BASIS AND TO DEMONSTRATE THAT REMOTE SENSING. FROM SPACE IS A FEASIBLE AND PRACTICAL APPROACH TO EFFICIENT MANAGEMENT OF THE EARTH'S RESOURCES. IN ACDITION TO DETAINING DATA FOR USE IN EARTH RESOURCE TYPE STUDIES, THE MSS SYSTEM WAS USED TO CONDUCT OCEANCGRAPHIC AND METEOROLOGICAL STUDIES. I.E., TO MAP SEA-ICE FIELDS, LOCATE AND TRACK MAJOR OCEAN CURRENTS. MONITOR BOTH AIR AND WATER POLLUTION, DETERMINE SNOW COVER. INVESTIGATE SEVERE STORM ENVIRONMENTS. ETC. THE MSS CONSISTED OF A 22.86-CM DOUBLE REFLECTOR-TYPE TELESCOPE. SCANNING MIRROR. FILTERS, DETECTORS. AND ASSOCIATED ELECTRONICS. THE SCANNER OPERATED IN THE FOLLOWING SPECTRAL INTERVALS -- BAND 1.0.5 TO 0.6 MICRON. BAND 2.0.6 TO 0.7 MICRON. BAND 3.0.7 TO 0.8 MICRON. AND BAND 4.0.8 TO 1.1 MICRONS. INCOMING RADIATION WAS COLLECTED BY THE SCANNING MIRROR, WHICH OSCILLATED 2.89 DEG TO EITHER SIDE

DF NADIR AND SCANNED CROSS-TRACK SWATHS 185 KM WIDE. THE ALONG-TRACK SCAN WAS PROCUCED BY THE ORBITAL MOTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCED AT THE IMAGE PLANE OF THE TELESCOPE WAS RELAYED BY USE OF FIBER OPTIC BUNDLES TO DETECTORS WHERE CONVERSION TO AN ELECTRONIC SIGNAL WAS ACCUMPLISHED. OPTICAL FILTERS WERE USED TO PRODUCE THE DESIRED SPECTRAL SEPARATION. SIX CETECTORS WERE EMPLOYED IN EACH OF THE FOUR SPECTRAL BANDS -- BANDS 1 THROUGH 3 USED PHOTOMULTIPLIER TUBES AS DETECTORS. AND BAND 4 USED SILICON PHOTOCIODES. A MULTIPLEXER INCLUDED IN THE MSS SYSTEM PROCESSED THE SCANNER'S 24 CHANNELS OF VIDEO DATA. THE DATA WERE TIME-MULTIFLE MED AND THEN CONVERTED TO A PULSE CODE MODULATED (PCM) SIGNAL BY AN AZD CONVERTER. THE DATA WERE THEN TRANSMITTED (2229.5 MHZ) DIRECTLY TO AN ACQUISITION STATION OR, IN THE CASE OF REMOTE AREAS, STORED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK THE NEXT TIME THE SPACECRAFT CAME WITHIN COMMUNICATION RANGE OF AN ACQUISITION STATION. DATA FROM THIS EXPERIMENT ARE HANGLED BY THE NASA DATA PROCESSING FACILITY. GSFC. GREENBELT. MD., AND ARE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS MAY EBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER. DEPARTMENT OF THE INTERIOR. SIDUX FALLS. S.D.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- DATA COLLECTION SYSTEM (DCS)

NSSDC ID 72-058A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE ERTS 1 DATA COLLECTION SYSTEM (DCS) WAS TO PROVIDE USERS WITH NEAR REAL-TIME DATA COLLECTED FROM VARIOUS REMOTE LOCATIONS. THE DCS WAS COMPOSED OF OF THREE DISTINCT SUBSYSTEMS -- (1) THE DATA COLLECTION PLATFORMS (DCP+S). (2) THE SATELLITE EQUIPMENT, AND (3) THE GROUND DATA CENTERS. WHICH INCLUDED REMOTE RECEIVING SITES AND THE GROUND DATA HANDLING SYSTEM AT GSFC. USE OF THE ERTS SPACEBORNE DCS PROVIDED A CONTINUAL FLOW OF INFORMATION TO BE USED FOR MANAGEMENT OF WILDLIFE, MARINE. AGRICULTURE. WATER. AND FORESTRY RESOURCES AND TO LEAD TO IMPROVED WEATHER FORECASTS. POLLUTION CONTROL. AND EARTHQUAKE PREDICTION AND WARNING. THE ENVIRONMENTAL SENSORS MOUNTED ON A DCP WERE SELECTED BY INDIVIDUAL INVESTIGATORS TO SATISFY THEIR PARTICULAR REQUIREMENTS. FROM A NOMINAL ORBIT OF APPROXIMATELY 900 KM. THE SPACECRAFT WAS CAPABLE OF ACQUIRING DATA FROM DCP'S WITHIN A RADIUS OF AROUND 3100 KM FROM THE SUBSATELLITE POINT, THUS ALLOWING DATA TO BE OBTAINED FROM ANY REMOTE PLATFORM AT LEAST ONCE EVERY 12 HR. THE DCPS\* TRANSMITTER FREQUENCY WAS 401.55 MHZ. LACKING INTERROGATION CAPABILITIES. THE DCS EQUIPMENT IN THE SPACECRAFT WAS ESSENTIALLY A RECEIVER. THE DATA WERE SIMPLY RECEIVED AND RETRANSMITTED (AT 2287.5 MHZ) TO SELECTED GROUND RECEIVING STATIONS. THERE WAS NO SIGNAL MULTIPLEXING OF DATA PROCESSING ON THE SATELLITE. THE ERTS DCS WAS DESIGNED TO ACCOMMODATE UP TO 1000 DCP S DEPLOYED THROUGHOUT THE CONTINENTAL UNITED STATES. HOWEVER, THE DCS INITIALLY CONSISTED OF A PILOT GROUP OF ONLY SIX DCP.S. WITH USER AGENCIES PROCURING. INSTRUMENTING. AND DEVELOPING ADDITIONAL PLATFORMS ACCORDING TO THEIR NEEDS. DATA FROM THIS EXPERIMENT ARE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY. GSFC. GREENBELT. MD.

ON 07/23/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/23/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

SPACECRAFT COMMON NAME- EXPLORER 46 NSSCC [C 72-061A ALTERNATE NAMES- METEC, MTS, 06142, METEORGID TECHNOLOGY SAT

LAUNCH DATE- 08/13/72 SPACECRAFT WEIGHT IN ORBIT- 200. KG

LAUNCH SITE- WALLERS ISLAND. UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-DAST

INITIAL ORBIT PARAMETERS

EPOCH DATE- 09/04/72 DRBIT TYPE- GEDCENTRIC ORBIT PERIOD- 97.65 MIN

APDAPSIS- 811. KM ALT PERIAPSIS- 492. KM ALT INCLINATION- 37.7 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/10/73 ORBIT TYPE- GEOCENTRIC CRBIT PERICO- 97.593 MIN

APOAPSIS- 792.50 KM ALT PERIAPSIS- 494.48 KM ALT INCLINATION- 37.691 DEG

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER: PS=PROJECT SCIENTIST)

PM - C.V. WOERNER NASA-LARC HAMPTON:VA.

PS - W.H. KINARC NASA-LARC HAMPTON: VA

#### SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVES OF THE METEOROID TECHNOLOGY SATELLITE WERE TO MEASURE THE METEOROID PENETRATION RATES IN A BUMPER-PROTECTED TARGET. AND TO OBTAIN DATA ON METEOROIC VELOCITY AND FLUX DISTRIBUTION. THE CENTRAL HUB OF THE SATELLITE WAS 320 CM LONG AND CARRIED THE VELOCITY AND IMPACT EXPERIMENTS. BUMPER TARGETS EXTENDED FROM THE SATELLITE. GIVING IT AN OVERALL WIDTH OF 701.5 CM. THE SPACECRAFT WAS SPIN STABILIZED AT 3 REM. AND SHOULD HAVE OPERATED FOR A MINIMUM OF ONE YR. HOWEVER. TWO CF THE FOUR PRIMARY EXPERIMENT BUMPER PANELS FAILED TO DEPLCY. CAUSING THE SPACECRAFT TO REVOLVE ABOUT AN AXIS DIFFERENT THAN THAT PLANNED. THIS ORIENTATION CAUSED THE TELEMETRY SYSTEM BATTERY TO OVERHEAT. AND NECESSITATED THE TURNOFF OF BOTH SECONDARY EXPERIMENTS (EXPERIMENTS -02 AND -C3) WITHIN TWO WEEKS AFTER LAUNCH.

ON 08/27/72. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- METEORGIC PENETRATION

NSSOC IC 72-061A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=CTHER INVESTIGATOR)
PI - W.H. KINARD NASA-LARC HAMPTON. VA

OI - D.H. HUMES

NASA-LARC

HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO MEASURE THE METEORGIO PENETRATION RATES OF A BUMPER-PROTECTED TARGET. PENETRATIONS WERE MEASURED. USING TWELVE 2-MIL STAINLESS-STEEL PRESSURE CELLS LCCATED BEHING 1-MIL STAINLESS-STEEL BUMPERS. THESE 12 CELLS WERE MOUNTED ON FOUR BUMPER PANELS WHICH EXTENDED OUT FROM THE CYLINDRICAL SPACECRAFT BODY. DUE TO A MALFUNCTION. ONLY TWO OF THE FOUR BUMPER FANELS DEFLOYED.

ON 08/27/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 08/27/72. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

SPACECRAFT COMMON NAME- DAG 3 PL-7010, BAG-C, COPERNICUS, 06163

NSSDC 1D 72-065A

2150. KG

ALTERNATE NAMES-

SPACECRAFT WEIGHT IN CRBIT-

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY

UNITED STATES

NASA-BSSA

INITIAL ORBIT PARAMETERS

LAUNCH DATE- 08/21/72

EPOCH DATE- 08/21/72 OREIT TYPE- GECCENTRIC GRBIT PERIOD- 99.7 MIN APDAPSIS- 751.000 KM ALT PERIAPSIS- 735.000 KW ALT INCLINATION- 35.012 DEG

RECENT DRBIT PARAMETERS

EPUCH DATE- 09/05/73 BRBIT TYPE- GEOCENTRIC CRBIT PERIOD- 99.709 MIN APDAPSIS- 749-15 KM ALT PERIAPSIS- 740.10 KM ALT INCLINATION- 35.011 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J. PURCELL

NASA-GSEC

GREENEELT. MD

PS - J.E. KUPPERIAN. JR. NASA-GSEC GREENEELT, ND

SPACECRAFT ERIEF DESCRIPTION

BAD-C CONTINUED THE MISSION OF THE DAD PROGRAM TO OBSERVE THE CELESTIAL SPHERE FROM ABOVE THE EARTH S ATMOSPHERE. A SPECTROMETER MEASURED HIGH-RESCLUTION SPECTRA OF THE STARS, GALAXIES, PLANETS, NEBULAE, THE SUN. ETC.. IN THE ULTFAVIOLET REGION OF THE SPECTRUM. THREE SMALL X-RAY TELESCOPES STUDIED X-RAY RACIATION IN THREE PASSBANDS BETWEEN 3 AND 60 A. THE UAS-C SPACECRAFT WAS A GROUND-CONTROLLABLE SPACECRAFT THAT WAS PLACED IN A LOW-ALTITUDE EARTH ORBIT. THE SPACECRAFT SHAPE WAS THAT OF AN OCTAGONAL CYLINDER WITH EXTENDABLE SOLAR PANELS. THE SILICON SOLAR CELL ARRAY SUPPLIED 30 W AND 50 W PEAK POWER. DATA WAS TRANSMITTED IN BOTH REAL TIME AND DELAYED TIME.

ON 08/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION HATE EECAME STANDARD.

NSSDC IC 72-065A-01

EXPERIMENT NAME- HIGH-RESOLUTION TELESCOPES

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - L. SPITZER PRINCETON L FRINCETON, NJ

CI - J. ROGERSON, JR. PRINCETON L PRINCETON, NJ

# EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVE OF THIS EXPERIMENT WAS TO MAKE QUANTITATIVE GBSERVATIONS OF THE INTERSTELLAR ABSCRPTION LINES IN THE SPECTRAL REGION 1000 TO 3300 A. THE SECCNDARY CBJECTIVE WAS TO CESERVE THE ULTRAVIOLET SPECTRA OF SELECTED BRIGHTER STARS IN DETAIL. THE PRIME OPTICAL SYSTEM WAS AN 80-CM DIAM CASSEGRAIN TELESCOPE WITH A 16-N FOCAL LENGTH (F/20). THIS TELESCOPE WAS COUPLED TO A PASCHEN-RUNGE SPECTROMETER CAPABLE OF 0.1-A RESOLUTION IN FIRST ORDER AND 0.05-A RESOLUTION IN SECOND ORDER. THE PHOTONS WERE DETECTED BY FOUR ENR PHOTOTUBES, EACH EQUIPPED WITH ITS OWN EXIT SLIT. AND MUVABLE IN PAIRS ALONG THE ROWLAND CIRCLE. A GUIDANCE ERROR SENSOR ATTACHED TO THE PRIME OPTICS CONTROLLED THE SPACECRAFT ATTITUDE TO WITHIN 0.1 ARC-SEC. THIS GUIDANCE SYSTEM LUCKED ONTO A STAR AS WEAK AS 7TH MAGNITUDE. THE OVERALL SYSTEM COULD MAKE USEFUL MEASUREMENTS ON 0- AND B-TYPE STARS OF 7TH MAGNITUDE.

ON 08/21/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NURMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQLISITION RATE BECAME STANDARD.

ON OB/21/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- STELLAR PHOTOMETRY

NSSDC ID 72-065A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR)
PI - R.L.F. BDYD U COLLEGE, LONDON LONDON, ENGLAND
OI - E.A. STEWARDSON U COLLEGE, LONDON LONDON, ENGLAND

#### EXPERIMENT SHIEF DESCRIPTION

THIS EXPERIMENT USED THREE TELESCOPES AND A COLLIMATED PROPORTIONAL COUNTER TO OBSERVE COSMIC X-RAY SOURCES BETWEEN 1 AND 70 A. BETWEEN 1 AND 3 ANGSTROMS A PROPORTIONAL COUNTER LOCATED BEHIND A COLLIMATOR WAS USED IN CONJUNCTION WITH PULSE-SHAPE DISCRIMINATION TO REJECT BACKGROUND COUNTS. FROM 3 TO 9 A AND 6 TO 18 A. PROPORTIONAL COUNTERS LOCATED AT THE FOCUS OF TWO GRAZING-INCIDENCE REFLECTING TELESCOPES (S.E SQ CM AND 12 SQ CM, RESPECTIVELY) WERE USED, WITH AN ANTICCINCIDENCE SCINTILLATOR ALSO EMPLOYED TO REJECT BACKGROUND COSMIC RAY COUNTS. AN OPEN CHANNEL MULTIPLIER LOCATED AT THE FOCUS OF A GRAZING INCIDENCE TELESCOPE (23 SC CM) WAS USED TO OBSERVE INTERSTELLAR ABSCRPTION OF SOFT X RAYS. THE 3- TO 9-A AND 6- TO 18-A DETECTORS FAILED IN JUNE 1973. THE 20- TO 70-A DETECTOR AFFEARS TO BE QUITE NOISY.

UN 08/21/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/00/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT, COMMON NAME- EXPLORER 47

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

NSSCC ID 72-073A

ALTERNATE NAMES -

PL-713A, IMP-H, IMP 7, 06197

390. KG

LAUNCH DATE- 09/23/72

SPACECRAFT WEIGHT IN GRBIT-

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

ASSO-ASAN

INITIAL ERBIT PAPAMETERS

EPUCH DATE- 09/25/72 GREIT TYPE- GEOCENTRIC CREIT FERICD- 7365. MIN APDAPS IS- 235639. KM ALT PERIAPSIS- 201599. KM ALT INCLINATION- 28.6 DEG

RECENT DREIT PARAMETERS

EPOCH CATE- 08/23/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 17602. MIN APOAPSIS- 233231. KM ALT FERIAPSIS- 202306. KM ALT INCLINATION- 8.566 DEG

SPACECRAFT PERSONNEL (FM=PRCJECT MANAGER, FS=FRCJECT SCIENTIST)

PM - P. BUTLER PS - N.F. NESS NASA-GSFC

GREENEELT. MD

GREENBELT. NO

PS - N.F. NESS

SPACECRAFT URIEF DESCRIPTION

IMP-H CONTINUED THE STUDY BEGUN BY EARLIER INF SFACECRAFT OF THE INTERPLANETARY AND MAGNETOTAIL REGIONS FROM A NEARLY CIRCULAR ORBIT NEAR 37 EARTH RADII. THIS 16-SIDED DRUM-SHAPED SPACECRAFT WAS 157 CM HIGH AND 135 CM IN DIAM. IT WAS CESIGNED TO MEASURE ENERGETIC PARTICLES, FLASMA, AND ELECTRIC AND MAGNETIC FIELDS. THE SPIN AXIS WAS ACRMAL TO THE ECLIPTIC PLANE. AND THE SPIN PERIOD WAS 1.3 SEC. THE SPACECRAFT WAS POWERED BY SOLAR CELLS AND A CHEMICAL BATTERY. SCIENTIFIC DATA WERE TELEMETERED TO EARTH AT 1600 BPS (WITH A SECONDARY 400-BPS RATE AVAILABLE).

ON 09/23/72. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID 72-073A-02

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, DIEDTHER INVESTIGATOR)

PI - H.S. BRIDGE DI - A.J. LAZARUS M I T M I T CAMBRIDGE. MA CAMBRIDGE. MA

DI - J.H. BINSACK

MIT

CAMBRIDGE. MA

OI - E.F. LYON

MIT

CAMBRIDGE. MA

EXPERIMENT BRIEF DESCRIPTION

A MODULATED SELIT-COLLECTOR FARADAY CUP WHICH WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND. TRANSITION REGION. AND MAGNETOTAIL. ELECTRONS WERE STUDIED IN EIGHT LOGARITHMICALLY EQUISPACED CHANNELS RETWEEN 17 EV AND 7 KEV. POSITIVE IONS WERE STUDIED IN EIGHT CHANNELS RETWEEN 50 EV AND 7 KEV. A SPECTRUM WAS DETAINED EVERY EIGHT SPACECRAFT REVOLUTIONS.

ANGULAR INFORMATION WAS OBTAINED IN EITHER 15 EQUALLY SPACED INTERVALS DURING A 360-DEC REVOLUTION OF THE SATELLITE OR IN 15 ANGULAR SEGMENTS CENTERED MORE CLOSELY ABOUT THE SPACECRAFT SUN LINE.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- IONS AND ELECTRONS IN THE ENERGY RANGE NSSDC 1D 72-0734-03 0.1 TO 2 MEV

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHEF INVESTIGATOR)
PI - G. GLDECKLER U OF MARYLAND COLLEGE PARK, MC
OI - C.Y. FAN U CF ARIZONA TUCSON, AZ
OI - D.K. HOVESTADT M.PLANCK INST.GARCHING GARCHING, WEST GERMANY

### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF LOW-ENERGY PARTICLES ASSOCIATED WITH SOLAR ACTIVITY. THE DETECTORS USED WERE (1) AN ELECTROSTATIC ANALYZER (TO SELECT FARTICLES OF THE DESIGNATED ENERGY PER CHARGE) COMBINED WITH AN ARRAY OF WINDOWLESS SOLID-STATE DETECTORS (TO MEASURE THE ENERGY LOSS) AND SURROUNDED BY AN ANTICOINCIDENCE SHIELDING AND (2) A PARTICLE TELESCOPE CONSISTING OF A SILICUN SURFACE BARRIER DETECTOR AND A FLAT. TWO-CHAMBER PROPORTIONAL COUNTER ENCLOSED IN AN ANTICOINCIDENCE SCINTILLATOR CUP. THE EXPERIMENT MEASURED PARTICLE ENERGIES FROM 0.1 TO 2 MEV PER CHARGE IN 12 BANDS AND UNIQUELY IDENTIFIED POSITIONS AND ELECTRONS AS WELL AS NUCLEI WITH CHARGES OF 2 FROM 1 TO 8 (NO CHARGE RESOLUTION FOR Z GREATER THAN 8). TWO 1000-CHANNEL PULSE HE IGHT ANALYZERS, ONE FOR EACH ELEMENT OF THE TELESCOPE, WERE INCLUDED IN THE EXPERIMENT PAYLOAC. THE TELESCOPE FAILED ON NOVEMBER 25, 1972 WHEN THE WINDOW ON THE PROPORTIONAL COUNTER WEAKENED AND BURST OUE TO EXPOSURE TO UV RADIATION.

ON 09/23/72, THE CATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/25/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS AND MISSOC TO 72-073A-04
ELECTRONS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - L.A. FRANK U OF IOWA ICWA CITY. IA

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED THE ENERGY SPECTRA OF LOW-ENERGY ELECTRONS AND PROTONS IN THE GEOCENTRIC RANGE 30 TO 40 R(E) TO FURTHER UNDERSTAND GEOMAGNETIC STORMS, AURDRA, TAIL AND NEUTRAL SHEET, AND OTHER MAGNETOSPHERIC PHENOMENA. THE CETECTOR WAS A DUAL-CHANNEL CURVED PLATE ELECTROSTATIC ANALYZER (LEPECEA - LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ANALYZER) WITH 10 ENERGY INTERVALS BETWEEN 5 EV AND 50 KEV. IT HAD AN ANGULAR FIELD OF VIEW OF 9 DEG X 25 DEG IN FOUR DIFFECTIONS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THE DETECTOR WAS OPERATED IN ONE OF TWO MODES (1) ONE PROVIDING

GOOD ANGULAR RESOLUTION (16 DIRECTIONS FOR EACH PARTICLE ENERGY EARD) ONCE EACH 272 SEC. AND (2) ONE PROVIDING GOOD TEMPORAL RESOLUTION IN WHICH THE ENTIRE ENERGY RANGE IN FOUR DIRECTIONS WAS MEASURED EVERY 68 SEC.

ON 09/23/72. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSDC IC 72-073A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR) PI - D.J. WILL IAMS NOAA-ERL BOULDER. CO 01 - C.O. BOSTROM APPLIED PHYSICS LAB SILVER SPRING. MD 01 - J.C. ARMSTRONG APPLIED PHYSICS LAB SILVER SPRING. MD . 01 - J.H. TRAINOR NASA-GSEC GREENEELT. MD

# EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THIS EXPERIMENT WERE (1) TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR COSMIC RAYS THROUGH THE INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW. (2) TO STUDY ELECTRON AND PROTON PATCHES THROUGHOUT THE GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE MAGNETOPAUSE. AND (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS INTO THE GEOMAGNETIC FIELD. THE INSTRUMENTATION CONSISTED OF A THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLID-STATE DETECTORS AND A MAGNETIC FIELD TO DEFLECT ELECTRONS. TWO SIDE-MOUNTED DETECTORS WERE USED TO DETECT THE ELECTRONS DEFLECTED BY THE MAGNET. TWO ADDITIONAL SCLID-STATE DETECTORS WERE USED TO DETECT VERY LOW-ENERGY (GREATER THAN 15 KEV) PARTICLES, ALPHA PARTICLES, AND CHARGED PARTICLES OF Z GREATER THAN 2. THE EXPERIMENT WAS DESIGNED TO MEASURE (1) PROTON FLUXES FROM 30 KEV TC GREATER THAN 8.6 MEV IN SIX RANGES. (2) ELECTRON FLUXES FROM 30 KEV TO GREATER THAN 450 KEV IN THREE RANGES, (3) CHARGED PARTICLES GREATER THAN 15 KEV. (4) ALFHA FARTICLES GREATER THAN 0.5 MEV. GREATER THAN 1.6 MEV. 2.2 TC 8.8 MEV. AND 8.8 TO 35 MEV, AND (5) CHARGED PARTICLES OF Z GREATER THAN 2 AT E GREATER THAN 5 MEV.

ON 09/23/72, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/26/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRONS AND HYDROGEN AND HELIUM ISCTOPES

NSSDC ID 72-073A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - E.C. STONE CAL TECH PASADENA, CA
OI - R.E. VOGT CAL TECH PASADENA, CA

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT STUDIED (VIA DIFFERENTIAL ENERGY SPECTRA) LOCAL ACCELERATION OF PARTICLES. ACCELERATION PROCESSES OF SCLAR PARTICLES. STORAGE IN THE INTERPLANETARY MEDIUM, AND SOLAR MCDULATION OF PARTICLES IN THE INTERPLANETARY MEDIUM. THE DETECTOR USED WAS A MULTI-ELEMENT. TOTALLY DEPLETED SOLID-STATE TELESCOPE WITH ANTICCINCIDENCE SHIELDING AND WAS

DPERATED IN ANY OF THREE MODES -- (1) THE ENERGY RANGE MODE. (2) THE ELECTRON MODE (150 KEV TO 2.8 MEV). AND (3) THE HYDROGEN AND HELIUM ISOTOPES MODE (0.5 TO 40 MEY/NUCLEON). THE DETECTOR HAD AN ANGULAR RESCLUTION OF PLUS TO MINUS 22 DEG.

ON 09/23/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR FLARE FIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT

NSSDC ID 72-073A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CHICAGO, IL

PI - J.A. SIMPSON OT - M.G. MUNOZ

U OF CHICAGO U OF CHICAGO

CHICAGO. IL

EXPERIMENT BRIEF DESCRIPTION THIS EXPERIMENT INCREASED THE UNDERSTANDING OF SOLAR FLARE PARTICLE ACCELERATION AND PARTICLE CONTAINMENT IN MAGNETIC FIELDS IN THE VICINITY OF THE SUN. THE DETECTOR POINTED ALONG THE SPACECRAFT SPIN AXIS. IT WAS A WINDOWLESS DE/DX VS E TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND OPERATED IN EITHER OF TWO MODES -- (1) THE HIGH 2 - LOW E MCDE HAVING AN ENERGY RANGE 0.5 TO 50 MEY/NUCLEON AND A CHARGE RANGE Z 5 TO 50 AND (2) THE LOW Z MODE. HAVING AN ENERGY RANGE 6 TO 1200 MEY/NUCLEON (ISOTOPES - HYDROGEN. DEUTERIUM. TRITIUM. HELIUM-3, HELIUM-4). THE ENERGY RANGE FOR ELECTRONS WAS PRIMARILY 0.3 TO 10 MEV. THE ACCEPTANCE ANGLE OF THE DETECTOR WAS 50-DEG FULL ANGLE.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PREPAGATION CHARACTERISTICS OF SOLAR NSSOC ID 72-073A-08 PROTONS AND ELECTRONS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) APPLIED PHYSICS LAB SILVER SPRING, MD .M.Z - 19 KRIMIGIS LAWRENCE . KS U OF KANSAS ARMSTRONG -4.F. ICWA CITY. IA U OF IOWA VAN ALLEN OI - JaA.

# EXPERIMENT BRIEF DESCRIPTION

THREE SOLIC-STATE CETECTORS IN AN ANTICOINCIDENCE PLASTIC SCINTILLATOR OBSERVED ELECTRONS BETWEEN 0.2 AND 2.5 MEV. PROTCAS BETWEEN 0.3 AND 500 MEV. ALPHA PARTICLES BETWEEN 2.0 AND 200 MEV. HEAVY PARTICLES WITH ATOMIC NUMBERS RANGING FROM 2 TO 5 WITH ENERGIES GREATER THAN 8 NEV. HEAVY FARTICLES WITH Z VALUES RANGING BETWEEN & AND 8 WITH ENERGIES GREATER THAN 32 MEV. AND INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLECN, ALL WITH DYNAMIC RANGES OF 1 TO ONE MILLION (FER SQUARE CM-SEC-STER). FIVE THIN WINDOW GEIGER-MUELLER TUBES DESERVED ELECTRONS OF ENERGY GREATER THAN 15 KEV. PROTONS OF ENERGY GREATER THAN 250 KEV. AND & FAYS WITH WAVELENGTHS BETWEEN 2 AND 10 A. ALL WITH A CYNAMIC RANGE OF 10 TO 100 MILLION (PER SQUARE CM-SEC-STER). PARTICLES AND X RAYS PRIMARILY OF SOLAR ORIGIN WERE

STUDIED, BUT THE DYNAMIC RANGE AND RESCLUTION OF THE INSTRUMENT PERMITTED COSMIC RAYS AND MAGNETOTAIL PARTICLES TO BE OBSERVED.

ON 09/23/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/26/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME - SOLAR - AND COSMIC-RAY PARTICLES

NSSCC IC 72-073A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.8.

GREENEELT, MO

MCDUNALC NASA-GSFC OI - D.E. HAGGE

NASA-JSC

HOUSTON, TX:

OI - B.J. TEEGARDEN

NASA-GSFC

GREENBELT, MD

# EXPERIMENT ERLEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT MEASURED ENERGY SPECTRA. COMPOSITION. AND ANGULAR DISTRIBUTION OF SOLAR AND GALACTIC ELECTRONS. PROTONS. AND HEAVIER NUCLEI UP TO Z = 30. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF A PAIR OF SOLIC-STATE TELESCOPES WHICH MEASURED INTEGRAL FLUXES ABOVE 150, 350. AND 700 KEV AND CF FROTONS PEGVE 0.5. .15. .70, 1.0, 1.2, 2.0, 2.5, 5.0, 15, AND 25 MEV. EXCEPT FOR THE .05 MEV PROTON MODE. ALL COUNTING MODES HAD UNIQUE SPECIES IDENTIFICATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE DEZDX VS E TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED NUCLEI FROM 1 TO 16 AMU WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEGN. COUNTS OF FARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE DETAINED AS COUNTS IN THE DEVOX. BUT NOT IN THE E. SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT CSI SCINTILLATOR TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND NUCLEI FROM 1 TO 30 AMU IN THE ENERGY RANGE 20 TO 500 MEV/NUCLECA. FOR PARTICLES BELOW EO MEV. THIS INSTRUMENT ACTED AS A DE/DX DETECTOR. ABOVE 80 MEV. IT ACTED AS A BIDIRECTIONAL TRIPLE DE/DX DETECTOR. FLUX CIRECTIONALITY INFORMATION WAS DETAINED BY DIVIDING CERTAIN PORTIONS OF THE CATA FROM EACH CETECTOR SYSTEM INTO EIGHT ANGULAR SECTORS.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

UN 09/26/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA.

NSSCC ID 72-073A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 01=0THER INVESTIGATOR) PI - S.J. BAME LOS ALAMOS SCI LAB LOS ALAMOS. NM
DI - J.R. ASBRIDGE LOS ALAMOS SCI LAB LOS ALAMOS. NM

LOS ALAMOS SCI LAB

LOS ALAMOS. NM

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND. MAGNETOSHEATH, AND MAGNETOTAIL. TONS AS HEAVY AS CAYGEN WERE RESCLVED WHEN THE SOLAR WIND TEMPERATURE WAS LOW. ENERGY ANALYSIS WAS ACCOMPLISHED BY

CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. IN THE SOLAR WIND. PCSITIVE ICAS FROM 200 EV TO 5 KEV (15 PEFCENT SPACING. 3 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOSHEATH, POSITIVE IONS FROM 200 EV TO 5 KEV (15 FERCENT SPACING. 3 PERCENT RESOLUTION) AND FROM 200 EV TO 2 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOTAIL. POSITIVE IONS FROM 200 EV TO 20 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) AND FROM 100 EV TO 20 KEV (15 PERCENT RESOLUTION) WERE STUCIED.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION FATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PLASMA WAVE EXPERIMENT

NSSDC ID 72-073A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, 01=0THER INVESTIGATOR) TRW SYSTEMS GROUP REDCADO BEACH, CA PI - F.L. SCARF REDCADE BEACH. CA TR & SYSTEMS GROUP 01 - G.M. CROOK REDONDO BEACH. CA TRW SYSTEMS GROUP GREEN OI - I.M. RECCNOS BEACH. CA TRW SYSTEMS GROUP FREDERICKS DI - R.W.

### EXPERIMENT BRIEF DESCRIPTION

ELECTRIC FIELD COMPONENTS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS AND THE MAGNETIC FIELD COMPONENT PARALLEL TO THAT AXIS WERE MEASURED BY AN ELECTRIC DIPOLE ANTENNA AND A SEARCH COIL MAGNETOMETER. BOTH SENSORS WERE MOUNTED ON A 3.05-M BOOM. DATA WAS OBTAINED IN EIGHT FREQUENCY CHANNELS FROM 10 HZ TO 100 KHZ IN EITHER THE NORMAL MODE OR THE SNAPSHOT MODE. TWO CHANNELS. CENTERED AT 67 AND 600 HZ, HAD 10-DB FALL-CFF POINTS OF 17 AND 150 HZ. AND 270 AND 810 HZ. RESPECTIVELY. THE REMAINING SIX CHANNELS WERE NARROW-EANDWIDTH CHANNELS CENTERED AT 1.3. 2.3. 5.4. 10.5. 30. AMD 70 KHZ. IN THE NORMAL MODE. THE ANTENNA WAS FIRST SAMPLED IN A GIVEN FREQUENCY CHANNEL MANY TIMES DURING A GIVEN MEASUREMENT PERICO (CCMPARAGLE TO THE SPACECRAFT SPIN PERIOD). DURING THE NEXT PERIOD. THE SEARCH COIL WAS SAMPLED MANY TIMES IN THE SAME FREQUENCY CHANNEL. NEXT. THE ANTENNA WAS SAMPLED IN THE NEXT FREQUENCY CHANNEL, FOLLOWED BY THE SEARCH COIL IN THAT CHANNEL. THE FREQUENCY CHANNELS WERE INCREMENTED. AND THE SAMPLED SENSORS WERE ALTERNATED UNTIL A FULL SET OF DATA WAS OBTAINED IN 16 MEASUREMENT FERICOS (APPROXIMATELY 20 SEC). IN THE SNAPSHOT MODE. ONLY ELECTRIC FIELD CATA WERE TRANSMITTED. AS FOLLOWS. THE ANTENNA WAS FIRST SAMPLED IN A GIVEN FREQUENCY CHANNEL MANY TIMES DURING A GIVEN MEASUREMENT PERIOD. IN THE NEXT PERIOD. THE ANTENNA WAS SAMPLED IN TWO SEQUENCES OF EIGHT FREQUENCY CHANNELS. THIS TWO-PERIOD MEASUREMENT WAS EXECUTED EIGHT TIMES, EACH TIME INCREMENTING THE FREQUENCY CHANNEL STUDIED IN EVERY OTHER PERIOD BY CNE. THUS. A FULL SET OF DATA AGAIN REQUIRED 16 MEASUREMENT PERIODS. IN ADDITION, AN ANALOG MODE. SAMPLING THE ANTENNA AND SEARCH COIL FROM 10 TO 100 HZ. WAS USED IN CONJUNCTION WITH THE SPECIAL PURPOSE ANALOG TELEMETRY TEST TO BE CONDUCTED. UNFORTUNATELY THIS NEW TELEMETRY SYSTEM DID NOT WORK WELL. AND LITTLE IF ANY USABLE DATA WERE OBTAINED IN THIS MODE OF OPERATION. FOR THE DIGITAL MODES. THE ELECTRIC AND MAGNETIC THRESHOLDS WERE SET BY INTERFERENCE CAUSED BY THE SOLAR CELL ARRAYS. THIS INTERFERENCE WAS DUE TO THE ASYMMETRIC SHEATH RELATED TO THE NON-CONDUCTING SATELLITE SLRFACE AND THE SIX-SIDEO GEOMETRY OF THE SPACECRAFT PANELS. IT IS EXPECTED THAT THE SE INTERFERENCE FROBLEMS

WILL ADVERSELY AFFECT MOST AMBIENT FIELD MEASUREMENTS.

ON 09/23/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/24/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR WIND ION COMPOSITION

NSSCC IC 72-073A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR)
PI + K.W. OGILVIE NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

AN ELECTROSTATIC ANALYZER AND WEIN-TYPE VELOCITY SELECTOR WERE USED TO GAIN EXPLORATORY DATA ON HEAVY ION COMPOSITION IN THE SOLAR WIND. THE BULK VELOCITIES OF 4HE++. 4HE+. 3HE++. AND O (ISOTOPES INDISTINGUISHABLE) IONS IN ALL IONIZATION STATES WERE SEPARATELY STUDIED. DURING 30 SUCCESSIVE SPACECRAFT SPIN FERIODS. IONS OF A GIVEN SPECIES WERE STUDIED IN 30 LOGARITHMICALLY EQUISPACED BULK VELOCITY CHANNELS FROM 200 TO 600 KM/SEC. A COMPLETE SET OF MEASUREMENTS REQUIRED ABOUT 10 MIN AND CONSISTO OF THIRTY 1-STEP SEQUENCES FOR 4 HE++ IONS AND FIVE 30-STEP SEQUENCES FOR EACH OF THE OTHER THREE SPECIES.

ON 09/23/72, THE DATE OF THE LAST ICENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/24/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- STUDY OF COSMIC-RAY, SOLAR, AND MACNETOSPHERIC ELECTRONS

NSSDC 1C 72-073A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=CTHER INVESTIGATOR)
PI - T.L. CLINE NASA-GSFC GREENBELT: MD

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT STUDIED GALACTIC AND SOLAR ELECTRONS AND FOSITRONS IN THE KINETIC ENERGY RANGE 50 KEV TO 2 MEV. INFORMATION ON PROTONS BETWEEN 0.5 AND 4.0 MEV WAS ALSO DETAINED. A COLLIMATED STILBENE CRYSTAL SCINTILLATOR LUCKING PERPENDICULAR TO THE SPACECRAFT SPIN AXIS SERVED AS THE PRINCIPAL DETECTOR. A SIMILAR, FULLY SHIELDED CRYSTAL SERVED TO DETERMINE THE CONTRIBUTION TO THE PRINCIPAL DETECTOR COUNT RATE OF ELECTRONS AND PROTONS GENERATED WITHIN THE PRINCIPAL DETECTOR BY GAMMA FAYS AND NEUTRONS, RESPECTIVELY. A FULLY SHIELDED CSI CRYSTAL SERVED AS A GAMMA-RAY SPECTROMETER AND WAS USED IN COINCIDENCE WITH THE PRINCIPAL DETECTOR TO DISTINGUISH ELECTRONS FROM POSITRONS. COUNT RATES FROM EACH DETECTOR DETAINS FROM POSITRONS. COUNT RATES FROM EACH DETECTOR ADDITION, THE AMPLITUDE AND SHAPE OF THE FULSE GENERATED IN THE PRINCIPAL DETECTOR BY THE FIRST STOPPING PARTICLE IN EACH AFFROFRIATE TELEMETRY FRAME WILL BE STUDIED. PULSE AMPLITUDE AND SHAPE WERE TO YIELD ENERGY (10 PERCENT RESOLUTION) AND PARTICLE SPECIES INFORMATION.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/13/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- NOAA 2 PL-701J. ITOS-D, 06235 ALTERNATE NAMES-

NSSDC ID 72-082A

LAUNCH DATE- 10/15/72 SPACECRAFT WEIGHT IN ORBIT-

409. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

NOAA-NESS UNITED STATES

. INITIAL CREIT PARAMETERS

EPOCH DATE- 10/15/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 114.9 MIN PERIAPSIS- 1448-18 KW ALT INCLINATION- 101-768 DEG APDAPSIS- 1453.57 KM ALT

RECENT DRBIT PARAMETERS

CRBIT PERIOD- 114.90 MIN EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC INCLINATION- 101.722 DEG APOAPSIS- 1453.73 KM ALT ' PERIAPSIS- 1446.37 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SARGENT PM - J. PS - I.L. COLDBERG NASA-GSFC NASA- ESFC

GREENEELT, MD. GREENEELT. ND

SPACECRAFT ERIEF DESCRIPTION

NOAA 2 WAS THE FIRST IN A SERIES OF RECONFIGURED ITDS-W SATELLITES LAUNCHED WITH NEW METECROLDIGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE 1705 SYSTEM. NGAA 2 WAS NOT EQUIPPED WITH CONVENTIONAL TV CAMERAS BUT INSTEAD WAS THE FIRST OPERATIONAL MEATHER SATELLITE TO RELY SOLELY UPON RACICMETRIC IMAGING TO BETAIN CLBUDGOVER DATA. THE PRIMARY OBJECTIVE OF NOAA 2 WAS TO PROVIDE GLOBAL CAYTINE AND NIGHTTIME DIRECT READOUT REAL-TIME CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONCUS SPACECRAFT WAS ALSO CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA FOR SELECTED AREAS IN EITHER & DIRECT READOUT OR A TAPE RECORDER MODE. A SECCEDARY OBJECTIVE WAS TO DETAIN GLOBAL SOLAR PROTON FLUX DATA ON A REAL-TIME DAILY BASIS. THE PRIMARY SENSORS CONSISTED OF A VERY FIGH RESCLUTION RACIOMETER (VHRR), A VERTICAL TEMPERATURE PROFILE RACIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR. VTPR, AND SR WERE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT MEASURED 1 BY 1 BY 1.2 M. THE SATELLITE WAS EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WERE FOLDED DURING LAUNCH AND DEPLOYED AFTER DRBIT WAS ACHIEVED. EACH PANEL MEASURED OVER 4.2 M IN LENGTH WHEN UNFOLDED AND WAS COVERED WITH 3420 SCLAR CELLS MEASURING 2 BY 2 CM. THE NCAA 2 DYNAMICS AND ATTITUCE CONTROL SYSTEM MAINTAINED DESIRED SPACECRAFT DRIENTATION THROUGH GYROSCOPIC PRINCIPLES INCORPURATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WAS MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INCUCED FROM A MCMENTUM FLYWHEEL SC THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER CREIT PROVIDED THE DESIRED EARTH-LOOKING ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WERE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF

THE MOMENTUM FLYWHEEL.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PROTON MONITOR

NSSDC ID 72-082A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - C+O+ BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MC

#### EXPERIMENT BRIEF DESCRIPTION

THREE SOLIC STATE CETECTORS MONITCRED THE GMNIDIRECTICNAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE 10, 30, AND 50 MEV. RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID STATE DETECTORS EACH MEASURED DIRECTIONAL FLUXES OF PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS). PROTONS BETWEEN 3.2 AND 60 MEV. PROTONS ABOVE 60 MEV. AND ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP REGION. WHICH IS OF THE GREATEST INTEREST. THE TELESCOPES VIEWED PARALLEL TO. AND PERPENDICULAR TO. THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID STATE DETECTOR MEASURED DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR LOOKED IN A DIRECTION FERPENDICULAR TO THE ORBIT PLANE.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SCANNING RADIOMETER (SR)

NSSDC ID 72-082A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

#### EXPERIMENT BRIEF DESCRIPTION

THE NOAM 2 SCANNING RADIOMETER (SR) SUBSYSTEM CONSISTED OF TWO SCANNING RADIOMETERS. A DUAL SR PROCESSOR, AND TWO SE RECORDERS. THIS SUBSYSTEM PERMITTED THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUNC. THE SEA. OR CLOUD TOPS VIEWED BY THE RADICMETER. THE RADICMETER MEASURED REFLECTED RADIATION FROM THE EARTH ATMOSPHERE SYSTEM IN THE 0.52- TO 0.73-MICRON BAND DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS AT MOSPHERE IN THE 10.5- TO 12.5-MICRON BAND DURING THE DAY AND NIGHT. UNLIKE A CAMERA, THE SR DID NOT TAKE A PICTURE BUT INSTEAD FORMED AN IMAGE USING A CUNTINUOUSLY ROTATING MIRROR. THE MIRROR SCANNED THE EARTH'S SURFACE PERPENCICULAR TO THE SATELLITE'S ORBITAL PATH AT A RATE OF 48 RFM. AS THE SATELLITE PROGRESSED ALONG ITS ORBITAL PATH. EACH ROTATION OF THE MIRROR PROVIDED ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR WAS PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO. FULL ORBITS OF DATA (145 MIN) COULD BE STORED ON MAGNETIC TAPE FOR SUESEQUENT TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA COULD BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. ONCE THE SIGNAL WAS RECEIVED BY THE GROUND STATION. A CONTINUOUS PICTURE WAS FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN WAS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. AT A NOMINAL SPACECRAFT ALTITUDE OF 1460 KM. THE RADIOMETER HAD A GROUND RESOLUTION OF BETTER THAN 4 KM AT NADIR. THE

RADIGMETER WAS CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF 4 AND 1 DEG K, RESPECTIVELY. DATA FROM THIS EXPERIMENT ARE FRESENTLY MAINTAINED AT NOA-NESS, SCITLAND, NO. ICENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E. -F. AND -G.

UN 10/15/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- VERY FIGH RESOLUTION RADIOMETER (VHRR) NSSDC ID 72-0824-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI + NESS STAFF NOAA-NESS SUITLAND, MD.

## EXPERIMENT BRIEF DESCRIPTION

THE NOAA 2 VERY HIGH-RESOLUTION RADICMETER (VHRR) EXPERIMENT WAS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT COULD ALSO BE PROGRAMMED TO RECORD UP TO 5 MIN OF DATA FOR RENCTE AREAS WHEN NO COA STATIONS WERE WITHIN RANGE OF THE SPACECRAFT. WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT CDA STATION THAT THE SPACECRAFT PASSED. THE EXPERIMENT INCLUDED TWO SCANNING RADIOMETERS. A MAGNETIC TAPE RECORDER. AND ASSUCTATED ELECTRONICS. THE TWO-CHANNEL VERR OPERATED SIMILARLY TO THE SCANNING RADIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NADIR). ONE VHRR CHANNEL MEASURED REFLECTED VISUAL RADIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE OF 0.6 TO 0.7 MICRON. THIS PRUVIDED MORE CONTRAST BETWEEN THE EARTH AND CLOUDS THAN THE SR BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL MEASURED INFRAFED RADIATION EMITTED FROM THE EARTH, SEA, AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTRAL REGION PERMITTED BOTH DAYTIME AND NIGHTTIME RACIANCE MEASUREMENTS. THE VHRR FORMED AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR EXCEPT THAT BOTH RADIGMETERS OPERATED SIMULTANEOUSLY. AS THE SATELLITE PROCEEDED IN ITS ORBIT. THE 400-RPM REVOLVING MIRRORS SCANNED THE EARTH'S SURFACE 180 DEG CUT OF PHASE ( ONE MIRROR AT A TIME ) AND PERPENDICULAR TO THE GREIT PATH. THE VISIBLE AND INFRARED DATA WERE TIME-MULTIPLEXED SO THAT THE SCAN OF THE INFRARED CHANNEL TRANSMITTED FIRST. FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WAS REPEATED 400 TIMES PER MINUTE. (EQUIVALENT TO THE SCAN RATE). IF CHE OF THE RADIOMETERS FAILED, THE SYSTEM WAS STILL CAPABLE OF MEASURING BUTH VISIBLE AND INFRARED RACIATION USING ONLY THE REMAINING RADIOMETER. DATA FROM THIS EXPERIMENT ARE PRESENTLY MAINTAINED AT NOAA-NESS. SUITLAND, MD. ICENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E. -F. AND +G.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- VERTICAL TEMPERATURE PROFILE RADIOMETER INSSC ID 72-082A-04

#### (VTPR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=CTHER INVESTIGATOR)
PI + NESS STAFF NGAA-NESS SUITLAND. MD

EXPERIMENT BRIEF DESCRIPTION

THE NOAA 2 VERTICAL PROFILE TEMPERATURE RADIOMETER (VTPR) SENSED THE RADIANCE ENERGY FROM ATMOSPHERIC CARBON DIGXIDE IN SIX NARROW SPECTRAL REGIONS CENTERED AT 15.0. 14.8. 14.4. 14.1. 13.8. AND 13.4 MICRONS. THE ATMOSPHERIC GROSS WATER VAPOR CONTENT WAS DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WERE ALSO TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLOUD TOP TEMPERATURES. THE VTPR CONSISTED OF AN OPTICAL SYSTEM. A DETECTOR AND ASSOCIATED ELECTRONICS. AND A SCANNING MIRROR. THE SCANNING MIRROR LOOKED AT THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S DRBITAL PATH. AS EACH AREA WAS SCANNED. THE OPTICAL SYSTEM COLLECTED, FILTERED, AND DETECTED THE RACIATION FROM THE EARTH INTO THE EIGHT SPECTRAL INTERVALS. THE FIELD OF VIEW CONTRIBUTING TO ONE PROFILE WAS APPROXIMATELY 50 KM SQ AT THE GROUND. THE RACIOMETER OPERATED CONTINUOUSLY. TAKING MEASUREMENTS OVER EVERY FART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WERE RECORDED THROUGHOUT THE CRBIT AND PLAYED BACK ON COMMAND WHEN THE SATELLITE WAS WITHIN COMMUNICATION RANGE OF A COMMAND AND ACQUISITION STATION. GROUND PERSONNEL USED THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. DATA FROM THIS EXPERIMENT ARE PRESENTLY MAINTAINED AT NOAA-NESS. SUITLAND. MD. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E, -F. AND -G. AS CF DECEMBER 1972, THE RADIOMETER CONTINUES TO FUNCTION NORMALLY.

ON 10/15/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT CCMMON NAME- ESRO 4
ALTERNATE NAMES- PL-724C. 06285

NSSCC ID 72-092A

LAUNCH DATE- 11/22/72

SPACECRAFT WEIGHT IN GREIT-

32. KG

LAUNCH SITE- VANCENBERG AFB. UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY .

INTERNATIONAL

ESRO

INITIAL CRBIT PARAMETERS

EPOCH DATE- 11/22/72 ORBIT TYPE- GEOCENTRIC CFBIT PERIOD- 98.873 MIN

APDAPSIS- 1169.95 KM ALT PERIAPSIS- 239.54 KM ALT INCLINATION- 91.106 DEG

RECENT ORBIT PARAMETERS

EPUCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC CREIT FERIOD- 95.282 MIN

APDAPSIS- 833.66 KM ALT PERIAPSIS- 230.83 KM ALT INCLINATION- 91.083 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PRCJECT SCIENTIST)

# SPACECRAFT BRIEF DESCRIPTION

THE ESRO 4 SPACECRAFT WAS DESIGNED TO INVESTIGATE NEUTRAL PARTICLE AND ION CONCENTRATIONS IN THE IONOSPHERE AND NEAR MAGNETOSPHERE. TO DETECT AURORAL PARTICLES. AND TO MONITOR SOLAR PARTICLES IN ORDER TO DISCOVER THE MECHANISM BY WHICH THEY PENETRATE AND DIFFUSE IN THE MAGNETOSPHERE. THE SPACECRAFT WAS LAUNCHED INTO A POLAR OREIT WITH A NODAL REGRESSION RATE NEAR ZERO. THUS PROVICING A COMPLETE SCAN ON LCCAL TIME IN & YEAR. TO PROVIDE AN ALTITUDE SCAN OVER THE WHOLE GLOBE, THE PERIGEE PRECESSED AT A RATE OF -3.5 DEG/DAY. THE SPACECRAFT WAS CYLINDRICAL IN SHAPE (SIMILAR IN CONSTRUCTION TO ESRO 2). WAS SRIN STABILIZED. AND USED A PCM/PM TELEMETRY MODE TRANSMITTED IN THREE FORMS -- REAL-TIME TELEMETRY AT 64 BPS. TAPE RECERDER PLAYBACK, AND HIGH-SPEED TELEMETRY AT 10,240 BPS.

ON 11/22/72. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- POSITIVE ION SPECTROMETER

NSSDC IC 72-092A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) LONDON. ENGLAND U COLLEGE. LONDON PI - R.L.F. 80YD

# EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY DEJECTIVE OF THIS EXPERIMENT. DESIGNATED AS EXPERIMENT SAS IN ESRO PROJECT DOCUMENTS. WAS TO MEASURE THE DENSITY AND TEMPERATURE OF ELECTRONS AND IONS IN THE VICINITY OF THE SPACECRAFT, AND TO IDENTIFY THE PROMINENT ION SPECIES PRESENT. THREE SPHERICAL PROBES OF CIFFERENT SIZES HERE FLOWN TO DETAIN THE DESIRED MEASUREMENTS. THE LARGEST ONE WAS 190 MM IN DIAMETER. FUNCTIONED AS AN ION MASS SPECTROMETER. AND WAS SURROUNDED BY A SPHERICAL GRID 200 MM IN DIAMETER WHICH WAS MAINTAINED AT A NEGATIVE POTENTIAL TO REPEL ELECTRONS. APPLICATION OF A SUITABLE VOLTAGE SWEEP TO THE PROBE ALLOWED SPECIES IDENTIFICATIONS TO BE MADE AND THEIR DENSITIES TO BE MEASURED. ONE CYCLE OF MASS SCAN WAS MADE EVERY 4.8 SEC. THIS SENSOR WAS MOUNTED ON A RACIAL BOOM, APPROXIMATELY 1300 MM FROM THE SPACECRAFT'S SKIN, IN ORDER THAT IT HAVE A 360-DEG \*LOOK ANGLE,\* AND THAT IT SAMPLE THE IONOSPHERE OUTSIDE THE SATELLITE'S CHARGE SHEATH. TO KEEP THIS ION MASS SENSOR FROM CROSSING THE SATELLITE'S WAKE, THE SATELLITE'S ATTITUDE HAD TO BE SUCH THAT THE VELOCITY VECTOR WAS KEPT INSIDE A CONE OF APPROXIMATELY 55 DEG HALF-ANGLE AROUND THE SPIN AXIS. THE SMALL ELECTRON COLLECTING PROBE. 10 MM IN DIAMETER, WAS VOLTAGE SWEPT TO PROVIDE ELECTRON TEMPERATURE AND DENSITY DATA. IN ADDITION. THIS LANGMUIR PROBE WAS MOUNTED RELATIVELY CLOSE TO THE MAIN PROBE. I.E., APPROXIMATELY 300 MM AWAY FROM IT. SO THAT THE SPACECRAFT POTENTIAL IT MEASURED COULD BE DIRECTLY APPLIED TO THE ION SPECTROMETER. WITHOUT BEING AFFECTED BY INDUCED FIELDS. IT WAS NOT MOUNTED CLOSE ENGUGH TO CAUSE MUTUAL INTERFERENCE. THE THIRD PROBE. 90 MM IN DIAMETER. WAS MOUNTED ON AN AXIAL BOOM PROTRUDING FROM THE SEPARATION PLANE OF THE SATELLITE (I.E. THE REAR) FOR APPROXIMATELY 350 MM. AND WAS FLOWN TO MONITOR TOTAL ION DENSITY. THE MEASUREMENTS FROM THIS SENSOR WERE ALSO USED TO BETTER INTERPRET AND EVENTUALLY CORRECT THE MEASUREMENTS MADE WITH THE MAIN PROBE. THIS EXPERIMENT REQUIRED A MINIMUM OF 5000 SQ CM OF CONDUCTING AREA ON THE SATELLITE SKIN. TO BE PROVIDED PRIMARILY BY TWO ADDITIONAL SPHERES ON THE END OF BOOMS. TO MAINTAIN THE SATELLITE AT REASONABLE POTENTIAL FOR THIS EXPERIMENT. THE POSITIVE SIDE OF THE SOLAR CELLS WAS GROUNDED.

ON 11/22/72. THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRAL MASS SPECTOMETER

NSSOC 10 72-092A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR) PI - U. VON ZAHN U OF BONN BONN, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO STUCY THE SPATIAL AND TEMPORAL VARIATIONS OF THE COMPOSITION AND MASS DENSITY OF THE NEUTRAL ATMOSPHERE IN THE ALTITUDE RANGE FROM ABOUT 300 TO 700 KM. TWO ELECTRONICS EDXES AND THE MASS SPECTROMETER COMPLETED THE EXPERIMENT HARDWARE. THE ANALYZER. A MONOPOLE, CONTAINED -- (1) AN ICH SOURCE WHERE NEUTRAL PARTICLES WERE. IDNIZED BY A THERMALLY GENERATED AND MAGNETICALLY FOCUSED ELECTRON BEAM. (2) THE RADIO FREQUENCY (RF) ANALYZING FIELD WHERE THE WASS SCANNING WAS ACHIEVED BY SUITABLE CHANGES IN THE RF AMELITUDES, (3) A TOTAL ION CURRENT MONITOR THAT MEASURED THE TOTAL DENSITY OF PARTICLES INSIDE THE ION SOURCE. AND (4) ION AND ELECTRON COLLECTORS AND AN ELECTRON MULTIPLIER. IT WAS ORIENTED IN THE SPACECRAFT TO INSURE THAT THE ICH SCURCE -- (1) HAD A FIELD OF VIEW OF 180 DEG AND (2) WAS ABOVE ANY OTHER PART OF THE SATELLITE SURFACE, TO MINIMIZE THE NUMBER OF CONTAMINANT PARTICLES (E.G., THOSE DUE TO DUTGASSING PROCESSES) ENTERING THE SOURCE. LAUNCHED SEALED UNDER VACUUM. THE ANALYZER WAS EXPOSED TO THE AMBIENT ATMOSPHERE IN DRBIT WHEN THE ION SOURCE PROTECTIVE CAP WAS EJECTED BY MEANS OF A PYROTECHNIC SYSTEM. THE MASS RANGE COVERED EXTENDED FROM 1 TO 44 AMU AND WAS SELECTED TO INSURE THAT THE CONCENTRATIONS OF THE PRINCIPAL ATMOSPHERIC CONSTITUENTS WERE DETERMINED. SPECIFICALLY, THE MEASURED SPECIES WERE -- ATOMIC HYDROGEN (1), HELIUM (4). ATOMIC DXYGEN (16). MOLECULAR NITROGEN (28). AND ARGON (40). IN ADDITION. BACKGROUND GASES WERE EVALUATED AND THREE CALIBRATION STEPS AT 5.5-AMU INTERVALS WERE INCLUDED. IT WAS POSSIBLE TO CORRECT UNFORESEEN CUTPUT DRIFTS BY COMMAND. PRICE TO LAUNCH. THE SPACECRAFT SURFACES IN THE REGION OF THIS EXPERIMENT PACKAGE WERE SEALED TO MINIMIZE DUTGASSING. THE NEUTRAL COMPOSITION AND CENSITY DATA WERE CORRELATED WITH MEASUREMENTS GETAINED FROM THE POSITIVE ION EXPERIMENT (72-092A-01).

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- AURORAL PARTICLE SPECTROMETER

NESDC ID 72-092A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - B.K.G. HULTQUIST KIRUNA GEOPHYSICAL OBS KIRUNA. SWEDEN

EXPERIMENT BRIEF CESCRIPTION

PRECIPITATION OF LOW-ENERGY PARTICLES AND THE MECHANISM OF THIS PRECIPITATION WAS INVESTIGATED BY MONITORING PITCH ANGLE DISTRIBUTIONS FOR PARTICLES IN VARIOUS ENERGY RANGES AND WAS CORRELATED WITH GROUND-BASED OBSERVATIONS. THE MAJOR PART OF THE EQLIPMENT WAS SWITCHED ON ONLY IN THE VICINITY OF NORTHERN SWEDEN. WHERE DATA WAS TRANSMITTED AT THE RATE OF

10.240 BPS FOR ABOUT 5 MIN. MOST OF THE MEASLREMENTS WERE MADE BY BANKS OF CHANNEL MULTIPLIERS MOUNTED TO LOOK RADIALLY AND SET TO DETECT PROTONS AND ELECTRONS MOSTLY IN THE C.15- TO 15-KEV ENERGY RANGE, BUT ONE OF THE INSTRUMENTS WAS SET TO COUNT ELECTRONS BETWEEN 0.1 AND 0.3 KEV. IN ADDITION. SOME CHANNEL MULTIPLIERS WERE MOUNTED TO LOOK AXIALLY. THERE WERE ALSO TWO GEIGER COUNTERS MONITORING ELECTRONS WITH ENERGIES GREATER THAN 40 KEV TOGETHER WITH THREE SOLID-STATE DETECTORS TO COUNT FROTONS AND ELECTRONS IN THE 50- TO 150-KEV RANGE.

ON 11/22/72, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER

NSSDC 10 72-0924-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=OTHER INVESTIGATOR)
PI - C. DE JAGER U OF LTRECHT LTRECHT, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THE ENTRY OF SOLAR PROTONS AND ALPHA PARTICLES MAINLY OVER THE POLAR CAPS WERE STUDIED USING TWO SOLID-STATE DETECTOR TELESCOPES. THE FIRST OF THESE USED TWO SURFACE BARRIER DETECTORS AND DETECTED PROTONS IN THE ENERGY RANGES BETWEEN 2.5 AND 20 MEV. TOGETHER WITH ALPHA FARTICLES IN THE CORRESPONDING RANGES. THIS TELESCOPE HAD A GEOMETRIC FACTOR OF ABOUT 0.55 CM SQ STER. THE VIEWING HALF-ANGLE WAS ABOUT 40 DEG. THE SECOND TELESCOPE ANALYZED PROTONS IN THREE RANGES BETWEEN 20 AND 160 MEV AND ALPHA PARTICLES IN THE CORRESPONDING RANGES . TWO SOLID-STATE DETECTORS WERE USED FOR THE ANALYSIS, WITH A THIRD AS AN ANTICOINCIDENCE SHIELD. THE GECMETRIC FACTOR FOR THIS TELESCOPE WAS ABOUT 1.1 CM SQ STER. AND THE VIEWING HALF-ANGLE WAS ABOUT 40 DEG. THE CENTER OF THE VIEWING DIRECTION OF THESE TWO TELESCOPES WAS TILTED AT 25 DEG TO THE SPIN AXIS OF THE SPACECRAFT IN AN ATTEMPT TO MINIMIZE THE EFFECT ON COUNTING RATES OF THE VARYING ANGLE BETWEEN THE SPIN AXIS AND THE MAGNETIC VECTOR. IT WAS INTENDED THAT THIS EXPERIMENT CONCENTRATE ON THE SOUTHERN POLAR CAP WHILE EXPERIMENT 72-0924-05 CARRIED OUT AN INVESTIGATION MOSTLY OVER THE NORTHERN POLAR CAP. THE INSTRUMENTS BEING TURNED ON ALTERNATELY BY AN AUTOMATIC SMITCH.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQLISITION RATE BECAME STANDARD.

ON 11/22/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NORTHERN POLAR CAP SOLAR PARTICLE NSSCC 1D 72-092A-05 SPECTROMETER

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI = R. LUST M.PLANCK INST.GARCHING GARCHING. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT HAD THE SAME SCIENTIFIC OBJECTIVE AS EXPERIMENT 72-092A-04. I.E., TO STUDY THE ENTRY OF SCLAR PROTONS AND ALPHA PARTICLES OVER THE POLAR CAP REGIONS. THE DATA FROM THE TWO EXPERIMENTS WERE

CORRELATED. TWO TELESCOPES WERE USED BUT WITH A SLIGHTLY DIFFERENT TECHNIQUE THAN FOR ESRO-4-C5. THE RANGE FROM ABOUT C.2 TO 8 MEV FCF FROTONS AND 2.5 TO 24 MEV FOR ALPHA PASTICLES WAS INVESTIGATED WITH THE AID CF TWO SILICON SURFACE BARRIER DETECTORS MOUNTED BELOW A TANTALUM COLLIMATOR THAT HAD A HALF-ANGLE OF AEOUT 22 DEG. THE GECMETRIC FACTOR CF THIS TELESCOPE WAS ABOUT 0.9 CM SQ STER. A MAGNET OF 1.2 KGAUSS WAS USED TO PREVENT THE ENTRY OF LOW-ENERGY ELECTRONS. THE SECOND TELESCOPE CONSISTED OF A STACK OF TWO SOLID-STATE DETECTORS MOUNTED ABOVE A CESIUM IODICE SCINTILLATOR. LIGHT FROM THE CESIUM IODIDE WAS COLLECTED BY TWO LIGHT-SENSITIVE DIDDES. THE WHOLE ASSEMBLY WAS SUFROUNDED BY A PLASTIC SCINTILLATOR THAT WAS VIEWED BY A PHOTOTUBE, SETTING THE CONE OF SENSITIVITY TO A HALF-ANGLE CF 30 DEG. THE GOEMETRIC FACTOR WAS APPROXIMATELY 1.5 CM SQ STER. COVERING ENERGY RANGES OF 8 TO 90 MEV FOR PROTONS AND 24 TO 360 MEV FOR ALPHA PARTICLES.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- APOLLO 17 LM/ALSEP

ALTERNATE NAMES- APOLLO 17C. 06307, LEW 17. ROVER 17. ALSEP 17

LAUNCH DATE- 12/07/72 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES

NASA-CMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R. PETRONE NASA HEADQUARTERS WASHINGTON, DC

SPACECRAFT ERIEF DESCRIPTION

THE APOLLO 17 LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED BY THE ASTRONAUTS IN THE NORTHEASTERN PORTION OF THE MOON (LATITUDE 20 DEG 10 MIN N. LONGITUDE 30 DEG 48 MIN E) ON THE SOUTHEASTERN RIM OF MARE SERENITATIS IN A DARK DEPOSIT BETWEEN MASS UNITS OF THE SOUTHWESTERN TAURUS MOUNTAINS SOUTH OF LITTROW CRATER. THE ALSEP EXPERIMENTS WERE POWERED BY A NUCLEAR POWER SOURCE AND INCLUDED PASSIVE LUNAR SOIL MECHANICS OBSERVATIONS. STUDY OF THE ATMOSPHERIC AND IGNIC ENVIRONMENT OF THE MOON, HEAT LOSS FROM THE LUNAR INTERIOR, FAR UV SPECTROMETER, IR SCANNING HADIOMETER, LUNAR SOUNDER, TRAVERSE GRAVIMETER, LUNAR EJECTA AND METEORITES, LUNAR SEISMIC PROFILING, SURFACE ELECTRICAL PROPERTIES, AND LUNAR SUFFACE GRAVITOMETER.

ON 12/11/72, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- HEAT FLOW

NSSCC IC 72-096C-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) LAMONT-DOHERTY GEO OBS PALISADES. NY PI - M.G. LANGSETF

## EXPERIMENT BRIEF CESCRIFTION

THE PURPOSE OF THE HEAT FLOW EXPERIMENT (S-037) WAS TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. SPECIFIC DEJECTIVES WERE (1) MEASUREMENT OF THE SUBSURFACE VERTICAL TEMPERATURE GRACIENTS IN THE LUNAR SURFACE LAYER AS A FUNCTION OF TIME, (2) MEASUREMENT OF THE ABSOLUTE TEMPERATURE OF THE LUNAR SUBSURFACE AS A FUNCTION OF TIME. (3) CETERMINATION OF THE THERMAL CONDUCTIVITY OF THE LUNAR SUBSURFACE MATERIAL . AND (4) MEASUREMENT OF THE ERIGHTNESS TEMFERATURE OF THE LOCAL LUNAR SURFACE. MEASUREMENTS TAKEN OF THE HEAT FLUX THROUGH THE UFFER 2.4 M OF THE SURFACE WILL PROVIDE DATA ON THE LUNAR SOIL THERMAL CONDUCTIVITY, WILL CONTRIBUTE TO THE RESOLUTION OF ISSUES CONCERNING LUNAR INTERNAL HEATING PROCESSES. AND WILL ESTABLISH LIMITS OF CONSTRAINT ON THE INTERIOR TENFERATURE AND COMPOSITION OF THE MOON. THE EXPERIMENT CONSISTED OF TWO PROCES. EACH ABOUT 1.2 M IN LENGTH, A SPECIAL TOOL FOR PROBE INSERTION, RACIATION SHIELDS FOR EACH PROBE. AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE ALSEP CONTROL STATION. TWO HOLES WERE DEILLED IN THE LUNAR SURFACE ABOUT 10 M APART. THE BORE SYSTEMS REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT WALL COLLAPSE. ONE PROBE WAS INSERTED INTO EACH HOLE. AND THE DEPTH OF THE PROBE WAS RECORDED.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME - LUNAR EJECTA AND METEORITES

NSSDC ID 72-096C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR» GI=OTHER INVESTIGATOR) GREENEELT. MD NASA-GSFC BERG PI - 0.E.

# EXPERIMENT BRIEF DESCRIPTION

THE APOLLO 17 LUNAR EJECTA AND METEORITE EXFERIMENT MEASURED THE FREQUENCY WITH WHICH THE MOCH IS IMPACTED BY PRIMARY COSMIC BUST PARTICLES AND THE EFFECT OF THE LUNAR EJECTA EMANATING FROM THE SITES OF METEGRITE IMPACTS ON THE LUNAR SURFACE. THE EXPERIMENT HAD THE FOLLOWING SPECIFIC OBJECTIVES -(1) TO CETERMINE THE BACKGROUND AND LONG-TERM VARIATIONS OF CUSMIC DUST INFLUX RATES IN CISLUNAR SPACE. (2) TO DETERMINE THE EXTENT AND NATURE OF LUNAR EJECTA PRODUCED BY METEORITE IMPACTS ON THE LUNAR SURFACE. (3) TO DETERMINE THE RELATIVE CONTRIBLTION OF COMETS AND ASTERDICS TO THE EARTH'S METECROID ENSEMBLE. (4) TO STUDY POSSIBLE CORRELATIONS BETWEEN THE ASSOCIATED EJECTA EVENTS AND THE TIMES OF THE EARTH'S CRUSSING OF CUMETARY DREITAL PLANES AND METEOR STREAMS . (5) TO DETERMINE THE EXTENT OF THE CONTRIBUTION OF INTERSTELL AR PARTICLES TOWARD THE MAINTENANCE OF THE ZODIACAL CLOUD AS THE SOLAR SYSTEM PASSES THROUGH GALACTIC SPACE, AND (6) TO INVESTIGATE THE EXISTENCE OF AN EFFECT CALLED "EARTH FOCUSING OF DUST PARTICLES .\* THE EQUIPMENT FOR THIS EXPERIMENT, WHICH WAS PART OF THE APCLLE 17 ALSÉP. INCLUTED ONE DEPLUYABLE UNIT WITH DETECTOR PLATES. ALSEP CENTRAL STATION ELECTRONICS, AND THE CABLE AND ASTRONATE CONNECTOR FOR NATING THE EXTERNAL UNIT WITH THE CENTRAL STATION. THE EXTERNAL UNIT COMPONENTS OR SENSORS CONSISTED OF SUPPRESSOR AND COLLECTOR PLATES, IMPACT PLATES, FILM FRAMES. AND MICROPHONES. THE SENSOR HAD A FIELD OF VIEW OF FLUS OR MINUS 60

DEG AND AN ANGULAR RESOLUTION OF PLUS OR MINUS 26 DEG. IT MEASURED PARTICLE IMPACTS IN AN ENERGY RANGE OF 1 TO 1000 ERGS WITH A PRIMARY FREQUENCY OF MEASUREMENT OF 10 TO THE -4 POWER IMPACTS/SQ M/SEC. THE EXTERNAL UNIT WAS ERECTED AND DEPLOYED ON THE LUNAR SURFACE ABOUT 8 M SOUTH OF THE ALSEP CENTRAL STATION. THE UNIT WAS ALIGNED TO FLUS OR MINUS 5 DEG. A COVER PROVIDED TO SHIELD THE DETECTOR PLATES FROM DIRT PARTICLES PRODUCED DURING LUNAR MODULE ASCENT LIFTOFF WAS JETTISONED BY EARTH COMMAND AT A SUITABLE TIME AFTER LIFTOFF.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

GN 12/11/72. THE DATE OF THE LAST IDENTIFIED EXFERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- LUNAR SEISMIC PROFILING EXPERIMENT

NSSDC ID 72-0960-06

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, DIEDTHER INVESTIGATOR)
PI - R.L. KOVACH STANFORD U STANFORD. CA

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR SEISMIC PROFILING EXPERIMENT (S-203) WAS TO ACQUIRE DATA ON THE PHYSICAL PROPERTIES OF THE LUNAR NEAR-SURFACE MATERIALS. SPECIFIC OBJECTIVES INCLUDED MEASURING THE LUNAR SEISMIC SIGNALS FRODUCED BY DETONATION OF EXPLOSIVE CHARGES ON THE SURFACE. MENITERING NATURAL SEISMIC ACTIVITY RESULTING FROM MOON QUAKES OR METEORITE IMPACTS, RECORDING THE SEISMIC SIGNALS RESULTING FROM THE ASCENT OF THE LN. AND RECORDING THE SEISMIC SIGNALS RESULTING FROM THE INPACT OF THE SPENT LN ASCENT STAGE. THIS EXPERIMENT YIELDED DETAILED INFORMATION ON LUNAR GEOLOGIC CHARACTERISTICS TO DEPTHS OF 3 KM. THE EQUIPMENT CONSISTED OF FOUR GEOFHENES. MARKER FLAGS. A GEOPHONE MODULE WITH A MARKER FLAG. AN ELECTRONICS PACKAGE IN THE ALSEP CENTRAL STATION. A TRANSMITTER. AN ANTENNA. AND EIGHT EXPLOSIVE PACKAGES. THE EXPLOSIVE PACKAGE MAJOR COMPONENTS WERE A RECEIVING ANTENNA. A RECEIVER. AN EXPLOSIVE TRAIN, A SIGNAL PROCESSOR, AND A FIRING PULSE GENERATOR. THE CREW DEPLOYED THE GEOPHONES AND THE GEOPHONE MODULE MARKED WITH FLAGS AND THEN PHUTOGRAPHED THEM DURING EVA 1. THE ANTENNAS AND ELECTRONICS PACKAGE WERE ALSO DEPLOYED AND CONNECTED TO THE ALSEP CENTRAL STATION. THE EXPLOSIVE PACKAGES WERE DEPLOYED AT DESIGNATED SITES DURING THE LUNAR TRAVERSES.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION

NSSDC ID 72-096C-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - J.H. HOFFMAN L OF TEXAS DALLAS. TX

EXPERIMENT BRIEF CESCRIPTION

THE DEJECTIVES OF THE LUNAR ATMOSPHERIC COMPOSITION EXPERIMENT INCLUDED (1) DETAINING DATA TO IDENTIFY THE GASES IN THE NATIVE LUNAR

ATMUSPHERE AT THE LUMAR SURFACE AND DETERMINING THEIR CONCENTRATIONS. (2) OBTAINING DATA TO DETERMINE THE VARIATIONS IN THESE GAS CONCENTRATIONS OVER TWO OR MORE LUNATIONS. AND (3) OBTAINING DATA ON SHORT-TERM TRANSIENT CHANGES IN THE LUNAR ATMOSPHERIC COMPOSITION. THE LUNAR SURFACE MASS SPECTROMETER UNIT INCLUDED A MINIATURE ANALYZER THAT SIMULTANEOUSLY SCANNED THE MASS RANGES (EXPRESSED IN ATOMIC MASS UNITS (AMU)) 1 TO 4. 12 TO 48. AND 27 TO 110. THE REMAINING COMPONENTS OF THE MASS SPECTROMETER UNIT WERE THE ELECTRONICS . FEATERS . DEPLOYABLE DUST COVER . AND A RIBBON CABLE CONNECTOR TO THE ALSEP CENTRAL STATION. A CREWMAN TRANSFERRED AND EMPLACED THE MASS SPECTROMETER UNIT ON THE LUNAR SURFACE APPROXIMATELY 15 M NORTHEAST OF THE ALSEP CENTRAL STATION. LEVEL TO IT TO WITHIN PLUS OR MINLS 15 DEG. AND MATED THE CABLE TO THE CENTRAL STATION.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/14/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NURMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME UNKNOWN.

EXPERIMENT NAME- LUNAR SURFACE GRAVIMETER

NSSDC ID 72-096C-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) COLLEGE PARK, MD U OF MARYLAND WEBER PI - J.

# EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR SURFACE GRAVIMETER EXPERIMENT (\$-207) WAS TO OBTAIN HIGHLY ACCURATE MEASUREMENTS OF THE LUNAR SURFACE GRAVITATIONAL ACCELERATION AND ITS TEMPORAL VARIATIONS AT A SELECTED POINT ON THE SURFACE. SPECIFIC DEJECTIVES WERE DETERMINATION OF THE VALUE OF LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 1 PART IN 10 TO THE FIFTH POWER). DETERMINATION OF THE MAGNITUDE OF LUNAR SURFACE DEFORMATION DUE TO TIDAL FORCES. MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR NATURAL SEISMICITY, AND MUNITURING OF FREE DECILLATIONS OF THE MOON THAT MAY BE INDUCED BY GRAVITATIONAL RADIATION FROM COSMIC SOURCES. PRECISE MEASURES CF ACCELERATION DUE TO GRAVITY OVER A PERIOD OF SEVERAL MONTHS ESTABLISHED THE DEFORMATION DUE TO TICAL FORCES AND CONTRIBUTED TO CONCLUSIONS ABOUT THE INTERNAL CONSTITUTION OF THE MOON. THE EQUIPMENT CONSISTED OF ELECTRONICS. SENSORS (SPRING MASS SUSPENSION CAPACITOR FLATES). A SUNSHIELD, AND A RIBBON CABLE TO THE CENTRAL STATION ELECTRONICS. THE CREW DEFLOYED THIS EXPERIMENT ABOUT 8 M W OF THE ALSEP CENTRAL STATION. THIS PROCEDURE CONSISTED OF LEVELING WITHIN PLUS CR MINUS 3 DEG. ALIGNMENT WITHIN PLUS OR MINUS 3 DEG USING THE SUNSHIELD SHADOW. AND MATING THE CABLE TO THE CENTRAL STATION.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITIEN RATE BECAME STANDARD.

CN 12/12/72, THE CATE OF THE LAST IDENTIFIED EXFEREMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

SPACECRAFT COMMON NAME- NIMEUS 5

NESCC ID 72-097A

ALTERNATE NAMES-

NIMBUS-E, PL-721B, 06305

LAUNCH DATE- 12/11/72

SPACECRAFT WEIGHT IN ORBIT-

681. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES .

LAUNCH VEHICLE- DELTA .

FUNDING AGENCY UNITED STATES

NASA-OSSA

INITIAL CRUIT PARAMETERS

EPOCH DATE- 12/11/72 ORBIT TYPE- GEOCENTRIC CRBIT PERIOD- 107-16 MIN APDAPSIS- 1101.27 KM ALT PERIAPSIS- 1089.52 KM ALT INCLINATION- 99.945 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC CREIT PERIOD- 107.16 MIN APOAPSIS- 1101.33 KM ALT PERIAPSIS- 1089.42 KM ALT INCLINATION- 99.933 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=FRGJECT SCIENTIST)

PM - S. WEILAND NASA-GSFC
PS - W-P- NORDREPG NASA-GSFC

GREENBELT, MD.

NORDBERG

□ NASA~GSFC GREENBELT. MD

SPACECRAFT BRIEF DESCRIPTION

THE NIMBUS 5 R AND D. SATELLITE WAS DESIGNED TO SERVE AS A STABILIZED. EARTH-GRIENTED FLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METECROLOGICAL AND GEOLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A HOLLOW RING-SHAPED SENSOR MOUNT. (2) SOLAR PADDLES. AND (3) A CONTROL HOUSING UNIT THAT WAS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SEMEWHAT LIKE AN CCEAN BUDY, NIMBUS 5 WAS NEARLY 3.7 M TALL, 1.5 M IN CLAMETER AT THE BASE, AND ABOUT 3 N WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT. WHICH FORMED THE SATELLITE BASE, HOUSED THE ELECTORICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS PROVIDED MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-BEAM STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGER SENSOR EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WAS LOCATED ON TOP UF THE SPACECRAFT. WERE SUN SENSORS. HORIZEN SCANNERS. AND A COMMAND ANTENNA. AN ADVANCED ATTITUDE CONTROL SYSTEM PERMITTED THE SPACECRAFT ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OF MINUS 1 DEG IN ALL THREE AXES. PRIMARY EXPERIMENTS INCLUDED (1) A TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAY AND NIGHT SURFACE AND CLOUDTOP TEMPERATURES, AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE, (2) AN ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMF) FOR MAPPING THE THERMAL RADIATION FROM THE EARTH'S SURFACE AND ATMOSPHERE, (3) AN INFRARED TEMPERATURE PROFILE RACIOMETER (ITPR) FCR OBTAINING VERTICAL FROFILES OF TEMPERATURE AND MOISTURE. (4) A NIMBUS-E MICROWAVE SPECTROMETER (NEMS) FOR DETERMINING TROPOSPHERIC TEMPERATURE PROFILES. ATMOSFHERIC WATER VAPOR ABUNDANCES, AND CLOUD LIQUID WATER CONTENTS, (5) A SELECTIVE CHEPPER RADIUMETER (SCR) FOR OBSERVING THE GLOBAL TEMPERATURE STRUCTURE OF THE ATMOSPHERE. AND (6) A SURFACE COMPOSITION MAPPING RADIOMETER (SCHR) FOR MEASURING THE DIFFERENCES IN THE THERMAL EMISSION CHARACTERISTICS OF THE EARTH'S SURFACE. TRANSMISSION OF USEFUL DATA FROM THE SCMR WAS TERMINATED ON JANUARY 4, 1973. AND THE ITPR IS OPERATING IN A RESTRICTED MODE.

UN 01/04/73, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INFRARED TEMPERATURE PROFILE RADIONETER INSSCRIBE 72-0974-01

#### (ITPR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) SUITLAND, MD NO AA-NESS PI - W.L. SMITH SUITLANC: MD NOAA-NESS D1 - D.G.

# EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR) EXPERIMENT WAS DESIGNED TO TEST THE FEASIBILITY AND OPERATIONAL AFPLICATIONS OF A REMOTE SOUNDING TECHNIQUE USING SIMULTANEOUS MEDIUM-RESOLUTION (32 KM) MEASUREMENTS IN NINE SPECTRAL INTERVALS. THE RADICMETER SENSED SIX INTERVALS IN THE 15-MICRON CARBON DIOXIDE BAND. ONE INTERVAL IN THE WATER VAPOR ROTATIONAL BAND NEAR 20 MICRONS. AND TWO SPECTRAL INTERVALS IN THE ATMOSPHERIC WINCOW REGIONS NEAR 3.6 AND 11 MICRONS. THE ITPR VIEWED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES DISTRIBUTED SYMMETRICALLY ABOUT NADIR IN A PLANE NORMAL TO THE ORBITAL TRACK. FORTY-TWO GEOGRAPHICALLY INDEPENDENT SCAN SPOTS WERE TAKEN ALONG A SINGLE STRIP. AS THE SATELLITE PROGRESSED ALONG ITS ORBITAL PATH, THE RACIOMETER OBSERVED 10 SUCH \*42-SPOT\* STRIPS TO FORM A 42 BY 10 MATRIX OF INDEPENDENT SCAN SPOTS. EACH MATRIX WAS PRODUCED IN 222 SEC WITH THE WHOLE SCANNING SEQUENCE REPEATED EVERY 240 SEC. THE MATRIX DATA WERE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. MATRIX MEASUREMENTS TAKEN IN THE CARBON DIDXIDE AND WATER VAPOR ABSORPTION BANDS WERE USED TO CALCULATE TEMPERATURE PROFILES AND TOTAL WATER VAPOR CONTENT IN THE TROPOSPHERE AND LOWER STRATOSPHERE. THE TWO WINDOW MEASUREMENTS HELPED TO DETECT AND ELIMINATE CLOUD CONTAMINATION OF THE RADIANCES. THUS PERMITTING ACTUAL DETERMINATION OF PROFILES DOWN TO THE EARTH'S SURFACE IN ALL BUT COMPLETELY DVERCAST AREAS. THE RADIOMETER WAS INITIALLY SUCCESSFUL. BUT AFTER APPROXIMATELY 50 ORBITS THE SCAN MOTION BECAME ERRATIC. AS OF JANUARY 1973. THE RACIOMETER WAS OPERATING BUT WITH ONLY 40 PERCENT OF ITS NORMAL SCAN CYCLE.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION HATE BECAME STANDARD.

NSSDC ID 72-097A-02 EXPERIMENT NAME- SELECTIVE CHOPPER RADIOMETER (SCR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) CXFCRD. ENGLAND OXFORD U PI - J.T. HOU GHT ON EDINBURGH, ENGLAND HERIOT-WATT U 01 - S.D. SMITH

## EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS & SELECTIVE CHOPPER RADIOMETER (SCR) WAS DESIGNED TO (1) OBSERVE THE GLOBAL TEMPERATURE STRUCTURE OF THE ATMOSPHERE UP TO 50 KM IN ALTITUDE. (2) MAKE SUPPORTING OBSERVATIONS OF WATER VAPOR DISTRIBUTION. AND (3) DETERMINE THE DENSITY OF ICE PARTICLES IN CIRRUS CLOUDS. TO ACCOMPLISH THESE OBJECTIVES, THE SCR MEASURED EMITTED RADIATION IN 16 SPECTRAL INTERVALS SEPARATED INTO THE FOLLOWING FOUR GROUPS -- (1) FOUR CARBON DIOXIDE CHANNELS BETWEEN 13.8 AND 14.8 MICRONS. (2) AN IR WINDOW CHANNEL AT 11.1 MICRONS AND A WATER VAPOR CHANNEL AT 18.6 MICRONS. (3) TWO CHANNELS AT 49.5 AND 133.3 MICRONS. (4) CHANNELS AT 2.08. 2.59. 2.65. AND 3.5 MICRONS. FROM AN AVERAGE SATELLITE ALTITUDE OF 1100 KM. THE FACIOMETER VIEWED A 48-KM CIRCLE ON THE EARTH'S SURFACE WITH A GROUND RESOLUTION OF ABOUT 13 KM AT NADIR. THE RECUCED TEMPERATURE FIELDS HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C. A SIMILAR EXPERIMENT WAS FLOWN ON NIMBUS 4.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE EECAME STANDARD.

ON 12/11/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NIMEUS-E MICROWAVE SPECTROMETER (NEMS) NSSOC ID 72-0974-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, EI=CTHER INVESTIGATOR) PI - D.H. STAELIN MIT CAMBRIDGE . MA GI - F.T. BARATE NASA-JPL PASADENA, CA 01 - N.E. GAUT ENVIRON RES + TECH INC STAMFORD. CT 01 - W.P. NORDBERG NASA+GSFC GREENBELT. MD 01 - P. THADDEUS NASA-GISS 'NEW YCRK, NY DI - W.B.

NASA-JSC

## EXPERIMENT BRIEF DESCRIPTION

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THE NIMBUS-E MICROWAVE SPECTROMETER (NEMS) WAS DESIGNED PRIMARILY TO DEMONSTRATE THE CAPABILITIES AND LIMITATIONS OF MICROVAVE SENSORS FOR MEASURING TROPOSPHERIC TEMPERATURE PROFILES. WATER VAPOR ABUNDANCES. CLOUD LIQUID WATER CONTENT, AND EARTH SURFACE TEMPERATURES. A SECONDARY PURPOSE WAS TO OBTAIN SUCH DATA FOR WEATHER PREDICTION PURPOSES. THE NEWS COULD CONTINUOUSLY MCNITOR EMITTED THERMAL RADIATION AT WAVELENGTHS OF 11.1, 9.55, 5.58, 5.46, AND 5.10 MM. THE THREE CHANNELS NEAR THE 5-MM OXYGEN ABSORPTION BAND WERE USED PRIMARILY TO DETERMINE THE ATMOSPHERIC TEMPERATURE PROFILE. NEMS WOULD PROVICE MEASUREMENTS FOR USE IN DERIVING TEMPERATURE PROFILES EVEN IN CLOUDCOVER CONDITIONS THAT NORMALLY RESTRICT THE USEFULNESS OF CONVENTIONAL IR CATA IN SUCH SITUATIONS. THE THE BATER VAFOR CHANNELS NEAR 10 MM PERMITTED THE WATER VAPOR AND CLOUD LIQUID WATER CONTENT OVER OCEANS TO BE ESTIMATED AND ALSO YIELDED AN ESTIMATED TEMPERATURE ONCE THE SURFACE EMISSIVITY HAD EEEN CALIBRATED BY COMPARISON WITH DIRECT MEASUREMENTS. THE THREE CXYGEN CHANNELS SHARED A COMMON SIGNAL AND REFERENCE ANTENNA. BOTH WATER VAPOR CHANNELS HAD THEIR DWN SIGNAL AND REFERENCE ANTENNAS. FROM AN AVERAGE SATELLITE HEIGHT OF 1100 KM. THE NEWS VIEWED A 180-KM CIRCLE ON THE EARTH'S SURFACE. NEMS DATA WERE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. A SOMEWHAT SIMILAR EXPERIMENT IS PLANNED FOR NIMEUS-F.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION FATE BECAME STANDARD.

ON 12/11/72, THE CATE OF THE LAST ICENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRICALLY SCANNING MICROWAVE RACIOMETER (ESMR)

NSSCC IC 72-097A-04

HCUSTON, TX

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=ETHER INVESTIGATOR) PI - T.T. WILHEIT, JR. NASA-GSEC GREENEELT, MD 01 - P. GLOERSEN NASA-GSEC GREENBELT, MD

## EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY DEJECTIVES OF THE NIMBUS-5 ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) WERE (1) TO DERIVE THE LIQUID WATER CONTENT OF CLOUDS FROM

BRIGHTNESS TEMPERATURES OVER OCEANS. (2) TO CBSERVE DIFFERENCES BETWEEN SEA ICE AND THE OPEN SEA OVER THE POLAR CAPS, AND (3) TO TEST THE FEASIBILITY OF INFERRING SURFACE COMPOSITION AND SOIL MCISTURE. TO ACCOMPLISH THESE OBJECTIVES. THE ESMR WAS CAPABLE OF CONTINUOUS GLOBAL MAPFING OF THE 1.55-CM (19.36 GHZ) RADIO THERMAL (MICROWAVE) RACIATION EMITTED BY THE EARTH/ATMOSPHERE SYSTEM AND COULD FUNCTION EVEN IN THE PRESENCE OF CLOUD CONDITIONS THAT BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS. A 90- BY 90-CM RADIOMETER ANTENNA SYSTEM, DEPLOYED AFTER LAUNCH, SCANNED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES IN A PLANE FERPENDICULAR TO THE SPACECRAFT ORBITAL TRACK, PRODUCING A BRIGHTNESS TEMPERATURE MAP OF THE SURFACE OF THE EARTH AND ITS ATMOSPHERE. THE SCANNING PROCESS WAS CONTROLLED BY A COMPUTER ON BOARD AND CONSISTED OF TE SYMMETRICALLY DISTRIBUTED INDEPENDENT SCAN SPOTS EXTENDING 50 DEG TO EITHER SIDE OF NADIR. ANGULAR SEPARATION OF THE SCAN SPOTS ALLOWED FOR AN 8.5 PERCENT OVERLAP BETWEEN VIEW POSITIONS. FROM A MEAN ORBITAL FEIGHT OF 1100 KM. THE RACIOMETER HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C WITH A SPATIAL RESOLUTION OF ABOUT 25 KM. THE ESMR DATA WERE STORED ON MAGNETIC TAPE FOR TRANSMISSION TO GROUND ACQUISITION STATIONS. A SIMILAR EXPERIMENT WILL BE FLCWN ON NIMBUS-F.

ON 01/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- TEMPERATURE/HUMIDITY INFRARED RADICMETER ASSCC ID 72-0974-08 (THIR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFEF INVESTIGATOR) NASA-GSFC MCCULLOCH PI - A.W.

# EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 TEMPERATURE-HUMIDITY INFRARED RACIOMETER (THIR) WAS DESIGNED TO DETECT EMITTED THERMAL RADIATION IN BOTH THE 10.5- TO 12.5-MICRON REGION (IR WINDOW) AND THE 6.5- TO 7.0-MICRON REGION (WATER VAPOR). THE WINDOW CHANNEL MEASURED CLOUDTED TEMPERATURES AND WAS CAPABLE OF PRODUCING CLOUDCEVER AND THERMAL GRADIENTS ON LAND MATER SUFFACES IN CLOUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PERTICOS OF THE ORBIT. THE OTHER CHANNEL OPERATED PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSOR DATA FROM THESE TWO CHANNELS WAS PRIMARILY USED TO SUPPORT THE OTHER. MORE SUPHISTICATED METEOROLOGICAL EXPERIMENTS ON BOARD NIMBLS 5. THE INSTRUMENT CONSISTED OF A 12.7-CM CASSEGRAIN SYSTEM, A SCANNING MIRROR COMMON TO BOTH CHANNELS, A BEAM SPLITTER, FILTERS, AND TWO GERMANIUM-IMMERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV. NO IMAGE WAS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WAS COLLECTED BY A FLAT SCANNING WIRROR INCLINED AT 45 DEG TO THE OPTICAL AXIS. THE MIRROR ROTATED AT 48 RPM AND SCANNED IN A PLANE PERPENDICULAR TO THE SPACECRAFT VELCCITY. THE ENERGY WAS FOCUSED ON A DICHROMATIC BEAM SPLITTER. WHICH DIVIDED THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THE THIR SENSOR TRANSFORMED THE RECEIVED RADIATION INTO AN ELECTRIC OUTPLY (VOLTAGES). WHICH WAS RECORDED ON MAGNETIC TAPE FER SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. A SIMILAR EXPERIMENT IS PLANNED FOR NIMBUS-F.

ON 01/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMON NAME- PIGNEER 11

ALTERNATE NAMES- PIONEER-G. PL-733C

NSSDC ID 73-019A

LAUNCH DATE- 04/06/73 SPACECRAFT WEIGHT IN ORBIT-

231. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY

UNITED STATES

NASA-OSSA

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

MOFFETT FIELD, CA

PM - C.F. HALL PS - J.H. WOLFE HALL NASA-ARC NASA-ARC

. MCFFETT FIELD. CA

#### SPACECRAFT BRIEF DESCRIPTION

PIONEER 11 IS THE SECOND OF TWO 231-KG, SPIN-STABILIZED EARTH POINTING SPACECRAFT DESIGNED TO PROVIDE INFORMATION ON THE INTERPLANETARY MEDIUM. THE ASTERDID BELT AND THE NEAR-JUPITER ENVIRONMENT. THIS JUPITER FLY-BY SPACECRAFT IS POWERED BY A RADIOISOTOPE THERMOELECTRIC GENERATOR AND A BATTERY. THE SPACECRAFT INSTRUMENTATION WILL STUDY THE INTERPLANETARY AND POSSIBLE JOVIAN MAGNETIC FIELDS. THE SOLAR WIND AND POSSIBLE JOVIAN BOW SHOCK AND MAGNETOPAUSE BOUNDARIES. SOLAR AND GALACTIC COSMIC RAYS. INTERPLANET ARY CHARGED PARTICLES AND POSSIBLE JOVIAN TRAPPED RADIATION. JOVIAN THERMAL ENERGY FLUX. ZODIACAL LIGHT. ASTERGICS AND METEGROIDS. AND INTERPLANETARY AND JOVIAN ULTRAVIOLET RADIATION. AN S-BAND OCCULTATION EXPERIMENT AND A JUPITER IMAGING AND PHOTOPOLARIZATION EXPERIMENT WILL BE PERFORMED. THE SPACECRAFT WILL FLY BY JUPITER BETWEEN 600 AND 750 DAYS AFTER LAUNCH AND MAY. DEPENDING ON THE AMOUNT OF THRUSTER FUEL LEFT AFTER THE JUPITER ENCOUNTER. CONTINUE ON TO ENCOUNTER WITH SATURN APPROXIMATELY 7 YEARS AFTER LAUNCH.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID 73-019A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)

PI - E.J. SMITH NASA-JPL GI ~ D.S. COLBURN . GI ~ P. DYAL 01 ~ P. OI - C.P. SONETT

NASA-ARC NASA-ARC NASA-ARC PASADENA - CA MOFFETT FIELD, CA MOFFETT FIELD. CA MCFFETT FIELD. CA

GI - P.J. COLEMAN. JR. OI - L. DAVIS

U OF CALIFCRNIA, LA - CAL TECH

LOS ANGELES, CA PASADENA, CA

01 - D.E. JONES

BRIGHAM YOUNG U

FROVE, UT.

# EXPERIMENT BRIEF DESCRIPTION

THE MAGNETOMETER ON PIONEER 11 IS A TRIAXIAL HELIUM MAGNETOMETER WITH SEVEN DYNAMIC RANGES. FROM PLUS OR MINUS 2.5 GAMPA TO PLUS OR MINUS 10 GAUSS. THE LINEARITY IS 0.1 PERCENT. THE NOISE THRESHOLD IS 0.01 GAMMA RMS FOR 0-1 HZ. THE ACCURACY IS 0.5 PERCENT OF FULL SCALE RANGE.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CHARGED PARTICLE COMPOSITION

NSSDC IC 73-019A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTHER INVESTIGATOR)

PI - J.A. SIMPSON

•A - 10

U OF CHICAGO CHICAGO. IL

CHICAGO. IL CCLLEGE FARK. MD

DI - J.J. C'GALLAGEER

U OF MARYLAND U DF CHICAGO

CHICAGO, IL

EXPERIMENT ERIEF DESCRIPTION

TUZZOLINC

THIS EXPERIMENT 1S DESIGNED TO MEASURE CHARGE COMPOSITION USING THREE TYPES OF DETECTORS —— (1) A 7-ELEMENT SOLIC-STATE DETECTOR TELESCOPE. (2) A HIGH-ENERGY ELECTRON DETECTOR (EGG). AND (3) A HIGH-ENERGY PROTON DETECTOR (FISSION FOIL). THE FIRST DETECTOR WAS TO MEASURE PROTONS (450 KEV TO 150 MEV). ELECTRONS (200 KEV TO 30 MEV). AND PARTICLES FROM H(Z=2) TO O(Z=16) (6 TO 150 MEV/NUCLEON). THE SECOND DETECTOR WAS TO MEASURE BREMSSTRAHLUNG RADIATION FROM ELECTRONS AND ELECTRONS DIRECTLY (E.GT. 9 MEV) AND WAS DESIGNED TO EXCLUDE PROTONS OF ENERGIES LESS THAN 50 MEV. THE THIRD DETECTOR WAS TO MEASURE PROTONS OF ENERGIES GREATER THAN 50 MEV. THE DETECTOR SAMPLE TIME WAS TO BE SYNCFRONIZED WITH THE SPACECRAFT SPIN AND SHOULD BE .EG. 1/8 OF A SPACECRAFT ROTATION OR ABOUT 1-1/2 SEC.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ASTEROID/METEOROID ASTRONOMY

ASSCC IC 73-019A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)
PI - R.K. SOBERMAN GENERAL ELECTRIC CO VALLEY FORGE. PA
OI - H.A. ZOOK NASA-JSC HCLSTCN, TX

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL SEARCH FOR PARTICLES WITH MASSES LARGER THAN ABOUT ONE MICROGRAM BY OBSERVING THE SDLAR LIGHT THE PARTICLES REFLECT AND SCATTER. FOUR INCEPENCENT TELESCOPIC SUBSYSTEMS WITH FOUR OVERLAPPING FIELDS OF VIEW WILL BE USED. WITH THE ENTRY AND DEPARTURE TIMES OF THE LIGHT FROM THE PARTICLES BEING USED TO DETERMINE THE RANGE AND VELOCITIES OF THE PARTICLES THEMSELVES. THE OPTICAL SUBSYSTEMS ARE COMPOSED OF 8-IN.

RITCHEY-CHRETIEN TELESCOPES WITH A 10-IN. FOCAL LENGTH AND A 0.2-RAD FIELD OF VIEW.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE: THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- METEOROID DETECTOR

NSSDC ID 73-019A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - W.H. KINARC NASA-LARC HAMPION, VA

## EXPERIMENT BRIEF DESCRIPTION

THE PIONEER-G METEOROID DETECTION EXPERIMENT WILL ATTEMPT TO DETECT THE DISTRIBUTION IN INTERPLANETARY SPACE OF METEOROIDS TOO SMALL TO BE SEEN BY LIGHT SCATTERING TECHNIQUES. THELVE PANELS, EACH CONTAINING 18 PRESSURIZED CELLS, ARE MOUNTED ON THE BACK OF THE SPACECRAFT ANTENNA DISH. THE PRESSURIZED CELLS CONSIST OF A 2-MIL-THICK STAINLESS STEEL GUTER LAYER WELDED TO A 1-MIL-THICK STAINLESS STEEL INNER LAYER WITH A LARGE NUMBER OF SMALL POCKETS OF GAS TRAPPED BETWEEN THEM. LOSS OF GAS PRESSURE FROM ANY OF THE CELLS WILL INDICATE A HIT, AND THE RATE OF GAS LCSS WILL INDICATE THE SIZE OF THE HOLE MACE. THUS THE MASS AND INCIDENT ENERGY OF THE METECROID PARTICLE CAN BE OBTAINED AND, WHEN COMBINED WITH TRAJECTORY DATA, WILL ALLOW THE SPATIAL DENSITY OF THE METEOROIDS TO BE DETERMINED. THE PANELS WILL DETECT IMPACTS. WITH PARTICLES HAVING A WASS OF GREATER THAN 10 TO THE -8 GM. THE PANELS WILL COVER 0.46 M SQ OF EXPOSED AREA ON PIONEER-G. RESULTS FROM THIS EXPERIMENT WILL BE COMBINED WITH THOSE FROM A SIMILAR EXPERIMENT FLOWN ON PIONEER 10 TO DETERMINE THE RANGE IN MASS OF SMALL FARTICLES ON BOTH THE INNER AND OUTER BOUNDARIES AND WITHIN THE ASTERDID BELT.

ON 04/06/73, THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN TRAPPED RADIATION

NSSDC ID 73-019A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - R.W. FILLIUS U GF CALIFORNIA, SD SAN DIEGO, CA

GI - C.E. MCILWAIN U OF CALIFORNIA, SD SAN DIEGO, CA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTS OF FOUR DETECTORS. A CERENKEV COUNTER WILL MEASURE ELECTRONS ABOVE 3. 7. AND 10 MEV. A SCLID-STATE ELECTRON SCATTER DETECTOR WILL USE THREE DISCRIMINATION LEVELS TO MEASURE ELECTRONS BETWEEN 100 KEV AND 3 MEV. A DC SCINTILLATOR DETECTOR WILL MEASURE THE SUM OF 25- TO 250-KEV ELECTRONS AND 800-KEV TO 250-MEV PROTONS. A SECOND SCLID-STATE DETECTOR WILL MEASURE SEPARATELY OMNIDIRECTIONAL 60- TO 250-MEV PROTONS AND MINIMUM IONIZING PARTICLES. THE FIRST THREE DETECTORS LCCK FERPENDICULAR TO THE SPACECRAFT SPIN AXIS. EACH DETECTOR HAS A 30-DEG HALF-ANGLE APERTURE. AND EACH MAKES EIGHT MEASUREMENTS PER SPACECRAFT SPIN PERIOD. WHILE THIS EXPERIMENT WAS CESIGNED FRIMARILY FOR ENCOUNTER. IT DOES OBTAIN CATA AT A LOW RATE IN INTERPLANETARY SPACE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME ALL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY

NSSDC 1C 73-019A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR)
PI - D.L. JUDGE USC LCS ANGELES, CA
OI - R.W. CARLSCN USC LOS ANGELES, CA

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT. A BROADBAND PHOTOMETER SENSITIVE BETWEEN 200 AND 800 A. OBSERVES EVICENCE OF HELIUM. WHICH IN TURN INDICATES INTERACTIONS BETWEEN CHARGED PARTICLES AND NEUTRAL HYDROGEN. CURING THE CRUISE PHASE OF THE MISSION THIS EXPERIMENT WILL BE USED TO SEARCH FOR THE SUPERSONIC TO SUBSONIC TRANSITION REGION IN THE SCLAR WIND. DURING THE JOVIAN ENCOUNTER. THIS EXPERIMENT WILL BE USED TO LOOK FOR EVIDENCE OF AN AURORAL OVAL ON THE JOVIAN CAYSIDE. TO FIND THE RATIO OF HYDROGEN TO HELIUM IN THE JOVIAN ATMOSPHERE. AND TO FIND THE TEMPERATURE OF THE CUTER PORTION OF THE JOVIAN ATMOSPHERE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- IMAGING PHOTOPOLARIMETER

NSSDC ID 73-019A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) TUCSON, AZ U OF ARIZONA GEHRELS PI - T. DUDLEY OBS ALBANY, NY 01 - J.L. WEINBERG TUCSON, AZ U OF ARIZONA OI - D.L. COFFEEN U OF ARIZONA TUCSON, AZ HAMEEN-ANTILLA 01 - J. U OF ARIZONA TUCSON . AZ 01 - C.E. KENKNIGHT SANTA BARBARA RSCH CEN SANTA BARBARA, CA 01 - R.F. HUMMER

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTS OF A POINTABLE 1-IN. MAKSUTOV TELESCOPE EQUIPPED WITH TWO COLOR DETECTORS (RED. \$800 TO 7000 A. AND BLUE. 3900 TO 4900 A) AND A POLARIZATION MEASURING CAPABILITY. THE FIELD OF VIEW CAN BE SELECTED FOR ZOCIACAL LIGHT STUDIES (32 X 40 NILLIRAD). PHOTOPOLARIMETRY (8 X 8 OR 12 X 12 MILLIRAD). OR IMAGING (0.5 X 0.5 MILLIRAD). CURING THE CRUISE PORTION OF THE MISSION THIS EXPERIMENT WILL BE USED TO OBSERVE ZODIACAL LIGHT TO ASSESS THE QUANTITY AND DISTRIBUTION OF FARTICULATE MATTER IN INTERPLANETARY SPACE. UPON APPROACHING JUPITER, THIS EXPERIMENT WILL BE USED FOR PHOTOMETRIC AND POLARIZATION STUDIES OF JUPITER AND ONE OR MORE OF ITS SATELLITES. DURING JOVIAN ENCOUNTER. THE EXPERIMENT WOULD TAKE ADVANTAGE OF THE SPACECRAFT SPIN IN ORDER TO MAKE TWO COLOR IMAGES OF JUPITER WITH A RESOLUTION OF 200 KM ON THE JOVIAN SURFACE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INFRARED RACIOMETER

NSSDC ID 73-019A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - G. MUNCH CAL TECH PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PIONEER G INFRARED RADIOMETER EXPERIMENT WILL MEASURE THE JOVIAN THERMAL BALANCE, TEMPERATURE DISTRIBUTION IN THE CUTER ATMOSPHERE. GENERAL SURFACE COMPOSITION. INCLUDING THE OVERALL HYDROGEN-IC-HELIUM RATIO. AND DARK SIDE TEMPERATURE. THE INSTRUMENT WILL CONSIST OF A 7.62-CM (3-IN.) REFLECTING CASSEGRAIN TELESCOPE WITH A 1-CEG BY 3-DEG FIELD-CF-VIEW THAT ILLUMINATES A PAIR OF 88-CHANNEL. THIN-FILM BIMETALLIC THERMOPILES IN TWO BANDS OF THE IR SPECTRUM (14 TO 25 MICRONS AND 19 TO 56 MICRONS) TO MEASURE THE IRRADIANCE. THE TWO-CHANNEL RADIOMETER WILL BE SIMILAR TO THOSE FLOWN ON MARINER 6 AND 7. BUT WILL BE MORE ACCURATE AND WILL HAVE BETTER SPATIAL RESOLUTION.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME ZERG.

EXPERIMENT NAME - CELESTIAL MECHANICS

NSSOC ID 73-019A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - J.D. ANDERSON NASA-JPL PASADENA. CA

EXPERIMENT BRIEF DESCRIPTION

TWO-WAY DOPPLER TRACKING OF THE SPACECRAFT WILL BE USED TO MAKE MORE PRECISE DETERMINATIONS OF PLANETARY MASSES. THE HELIGCENTRIC CREIT OF JUPITER, AND THE GRAVITATIONAL FIELDS OF THE SUN. JUPITER, AND THE GALILEAN SATELLITES.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- S-EAND OCCULTATION

NSSDC ID 73-019A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PASADENA . CA NA SA-JPL PI - A.J. KLICRE PASADENA. CA FJELDBO NASA-JPL 01 - G. FASADENA, CA NASA-JPL 01 - D.L. CAIN NEW YORK, NY NASA-GISS SEIDEL 01 - E.L. NASA HEADQUARTERS WASHINGTON. DC RAS OOL 01 - S.I.

# EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL UTILIZE RADIC REFRACTION EFFECTS ON THE SPACECRAFT'S BAND RADIO SIGNAL TO DETERMINE THE VERTICAL DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES IN THE JOVIAN ATMOSPHERE.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN CHARGED PARTICLES EXPERIMENT NSSDC 10 73-019A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR.)
PI - J.A. VAN ALLEN COF IOWA IOWA CITY. IA

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE PARTICLES IN THE VICINITY OF JUPITER USING THREE SETS OF DETECTORS -- (1) A THREE-ELEMENT GEIGER TUBE TELESCOPE, (2) A THREE-ELEMENT TRIANGULAR ARRAY OF CETECTORS, AND (3) A LOW-ENERGY GEIGER TUBE DETECTOR. THE FIRST DETECTOR WILL MEASURE ELECTRONS (E.GT. 2 MEV) AND PROTONS (E.GT. 10 MEV). THE SECOND WILL TO MEASURE ELECTRONS (E.GT. 10 MEV). AND THE THIRD WILL ALSO MEASURE ELECTRONS (E.GT. 50 KEV). THE DETECTOR SAMPLE TIME IS TO BE SYNCHRONIZED WITH THE SPACECRAFT TELEMETRY SYSTEM AND WILL DEPEND UPON THE TELEMETRY BIT RATE, I.E., THE SAMPLE TIME MAY RANGE FROM 3/32 SEC TO 12 SEC.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC-RAY SPECTRA

NSSOC IC 73-019A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) NASA-GSFC GREENEELT, MD PI - FaB. MCDONALD U OF ADELA IDE ACELAIDE. AUSTRALIA 01 - K . G.a MCCRACKEN U OF NEW HAMPSHIRE DURHAM. NH WEBBER OI - W.R. BI - E.C. U OF NEW HAMPSHIRE CURHAM. NH ROELOF NA SA+GSFC GREENBELT. MD 01 - B.J. TEEGARDEN GREENBELT, MD NASA-GSFC DI - J.H. TRA INOR

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTS OF THREE 3-ELEMENT TELESCOPES, ALL LOOKING NORMAL TO THE SPACECRAFT SPIN AXIS. A EI-DIRECTIONAL TELESCOPE WILL MEASURE 20- TO 800-MEV/NUCLEON PARTICLES WITH 5 TO 10 PERCENT ENERGY RESOLUTION.

ANOTHER TELESCOPE WILL MEASURE 3- TO 22-MEV/NUCLEON PARTICLES WITH 5 PERCENT

RESCLUTION. THESE TWO TELESCOPES WILL MEASURE PARTICLES WITH Z VALUES BETWEEN 1 AND 8. THE THIRD TELESCOPE WILL MEASURE 50-KEV TO 1-MEV ELECTRONS AND 50-KEV TO 20-MEV PROTONS WITH 20 PERCENT RESCLUTION.

CN 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PLASMA EXPERIMENT

MSSDC IC 73-019A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PI - J.H. WOLFE NASA-ARC MOFFEIT FIELD, CA

OI - L.A. FRANK U OF IOWA IOWA CITY, IA

OI - R. LUST M.PLANCK INST.GARCHING MUNICH, W. GERMANY

OI - D.S. INTRILIGATOR USC LOS ANGELES, CA

#### EXPERIMENT BRIEF DESCRIPTION

TWO QUADRISPHERICAL ELECTROSTATIC ANALYZERS ARE USED TO STUDY THE DIRECTIONAL INTENSITY OF SOLAR WIND IONS AND ELECTROS. THE DETECTORS ARE ALSO USED TO DESERVE A POSSIBLE JOVIAN EGW SHOCK, MAGNETOSHEATH, AND MAGNETOPAUSE. THE INSTRUMENTS WILL STUDY FOSITIVE IONS IN 32 ENERGY/CHARGE STEPS BETWEEN 100 V AND 18 KV. AND ELECTRONS IN 16 STEPS BETWEEN 100 V AND 18 KV.

ON 04/06/73. THE CATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN MAGNETIC FIELD

NSSDC ID 73-019A-14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI + N.F. NESS NASA-GSFC GREENEELT. MD

OI - M.H. ACUNA NASA-GSFC GREENBELT. MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS TRIAXIAL FLUXGATE MAGNETOMETER IS DESIGNED TO STUDY THE JOVIAN MAGNETIC FIELD. EACH SENSOR WILL OPERATE IN THE RANGE 0.01- TO 10-GAUSS. WITH 0.1 PERCENT DIGITIZATION ACCURACY. IT IS ANTICIPATED THAT ONE VECTOR MEASUREMENT WILL BE OBTAINED EACH 36 SEC.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

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NESCC IC 73-027A

SPACECRAFT COMMON NAME - SKYLAB ALTERNATE NAMES -

LAUNCH DATE- 05/14/73 SPACECRAFT WEIGHT IN DRBIT- 90607. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY UNITED STATES

N AS A-OMS F

INITIAL ORBIT PARAMETERS

ORBIT PERIOD- 93.4 MIN EPOCH DATE- 05/14/73 ORBIT TYPE- GEOCENTRIC 442. KM ALT PERIAPSIS- 434. KM ALT INCLINATION-50 .0 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 05/14/73 ORBIT TYPE- GEOCENTRIC CRBIT PERICO- 93.4 MIN 442. KM ALT PERIAPSIS- 434. KM ALT INCLINATION- 50.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST) HOUSTON: TX OZL-AZAN PM - D.G. SMITH

SPACECRAFT BRIEF DESCRIPTION

THE SKYLAE WAS A MANNED. CRBITING SPACECRAFT COMPOSED OF FIVE PARTS. THE APOLLO TELESCOPE MOUNT (ATM). THE MULTIPLE DCCKING ADAPTER (MDA). THE AIRLOCK MODULE (AM). THE INSTRUMENT UNIT (IU), AND THE ORBITAL WORKSHOP (OWS). THE SKYLAB WAS IN THE FORM OF A CYLINDER. WITH THE ATM BEING POSITIONED 90 DEG FROM THE LONGITUDINAL AXIS AFTER INSERTION INTO ORBIT. THE ATM WAS A SOLAR COSERVATORY. AND PROVIDED ATTITUDE CONTROL AND EXPERIMENT POINTING FOR THE REST OF THE CLUSTER. IT WAS ATTACHED TO THE MOA AND AM AT ONE END OF THE DWS. THE RETRIEVAL AND INSTALLATION OF FILM USED IN THE ATM WAS ACCOMPLISHED BY ASTRONAUTS DURING EXTRAVEHICULAR ACTIVITY (EVA). THE MDA SERVED AS A DOCK FOR THE COMMAND AND SERVICE MODULES, WHICH SERVED AS PERSONNEL TAXIS TO THE SKYLAB. THE AM PROVIDED AN AIRLOCK CETWEEN THE MDA AND THE OWS. AS WELL AS CONTAINING CONTECLS AND INSTRUMENTATION. THE IU WAS USED ONLY DURING LAUNCH AND THE INITIAL PHASES OF CHERATICH, AND PROVIDED GUIDANCE AND SEQUENCING FUNCTIONS FOR THE INITIAL DEFLOYMENT OF THE ATM. SOLAR ARRAYS. ETC. THE DWS WAS A MODIFIED SATURN 46 STAGE SUITABLE FOR LONG DURATION MANNED FABITATION IN DRBIT. IT CONTAINED PROVISIONS AND CREW QUARTERS NECESSARY TO SUPPORT THREE-MAN CREWS FOR FERIODS OF UP TO 56 DAYS EACH. ALL PARTS WERE ALSO CAPABLE OF UNMANNED. IN-CRBIT STORAGE. REACTIVATION AND REUSE.

ON 09/25/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- WHITE LIGHT CORONAGRAPH

NSSCC ID 73-027A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) MACQUEEN U OF COLORADO BOULDER. CO PL - R. BCLLDER, CO U OF COLORACE 01 - G. NEWKIRK. JR.

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT. LOCATED IN THE ATM. USED AN EXTERNALLY OCCULTED CORONAGRAPH TO MONITOR, BETWEEN 4000 AND 6000 A. THE BRIGHTNESS, FORM, AND POLARIZATION OF THE SOLAR CORONA AT RACIAL DISTANCES OF 1.5 TO 6.0 SOLAR RADII.

ON 09/25/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/25/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- X-RAY SPECTROGRAPHIC TELESCOPE

NSSDC ID 73-027A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R. GIACCONI HARVARD COLLEGE CBS CAMBRIDGE, MA
OI - M. ZOMBECK AS+E CAMERIDGE, MA

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT, LOCATED IN THE APOLLO TELESCOPE MOUNT, DESERVED SOLAR X-RAY EMISSIONS IN THE 2- TO 10-A RANGE WITH HIGH SPATIAL, SPECTRAL (0.5 A), AND TEMPORAL RESOLUTION.

UN 09/25/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/25/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME— UV SCANNING
POLYCHROMATOR/SPECTROHELIOMETER

NSSCC IC 73-027A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L. GOLDBERG HARVARD COLLEGE OBS CAMBRIDGE, MA
DI - E.M. REEVES HARVARD COLLEGE OBS CAMBRIDGE, NA

## EXPERIMENT BRIEF CESCRIPTION

THE DEJECTIVE OF THIS EXPERIMENT, WHICH WAS LCCATED ON THE APOLLO TELESCOPE MEUNT, WAS TO OBTAIN EXTREME ULTRAVIOLET (EUV) OBSERVATIONS OF A VARIETY OF STRUCTURES IN THE SOLAR CHRCMOSPHERE, CORONA, AND CHROMOSPHERIC-CORONAL TRANSITION LAYER. AN ULTRAVICLET SCANNING POLYCHROMATUR SPECTFORELIGMETER OPERATED IN A SPECTRAL RANGE OF 296 TO 1350 A WITH A RESOLUTION OF 1.5 A. THE INSTRUMENT HAD THREE BASIC OBSERVING MODES. FIRST. A MIRRUR RASTER SCANNING MODE WAS USED IN WHICH SPECTROHELIOGRAMS OF A 5.5- BY 8-ARC-MINHSG AREA WERE ACQUIRED IN UP TO SEVEN WAVELENGTHS SIMULTANEOUSLY. EACH SCAN TOOK APPROXIMATELY 5.5 MIN TO COMPLETE. SECOND. A MIRROR LINE SCANNING MODE ACQUIRED DATA FOR SEVEN WAVELENGTHS SIMULTANEOUSLY IN AN AREA 5 ARC-SEC BY 5.5 ARC-MIN. THIS TOOK APPROXIMATELY 5.5 SEC. THIRD. A GRATING WAVELENGTH SCANNING MCDE WAS USED. IN WHICH THE SPECTRUM OF A 5- BY 5-ARC-SEC-SQ AREA WAS SCANNED IN 3.8 MIN. THE SCAN CONSISTED OF 5270 DATA POINTS. THE INSTRUMENT COULD BE OPERATED DURING MANNED: UNATTENDED, OR UNMANNED FEFTEDS OF THE SKYLAB MISSION. COUNT DATA WERE RECORDED AND THEN TRANSMITTED TO EARTH EVERY CREIT.

ON 09/25/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NURMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/25/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

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SPACECRAFT COMMEN NAME - EXPLORER 49 NESDC 1D 73-039A
ALTERNATE NAMES - RADIO ASTRONOMY EXPLORER, PL-693B, FAE-B, 06686

LAUNCH DATE- 06/10/73 SPACECRAFT WEIGHT IN ORBIT- 250. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- LT DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 06/21/73 ORBIT TYPE- SELENDCENTRIC CFBIT PERIOC- 221-17 MIN

APDAPSIS- 1063-84 KM ALT PERIAPSIS- 1062-98 KM ALT INCLINATION- 38-721 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC CREIT PERICE- 221.91 MIN

APO APS IS- 1070.25 KM ALT PERIAPS IS- 1055.07 KM ALT INCLINATION- 38.676 DEG

SPACECRAFT PERSUNNEL (FM=PRCJECT MANAGER, FS=FRCJECT SCIENTIST)

PM + J.T. SHEA NASA-GSFC GREENBELT, MD

PS - R.G. STONE NASA-GSFC GREENBELT, MD

SPACECRAFT ERIEF DESCRIPTION

THE RAE-E SPACECRAFT MEASURED WITH DIRECTIVITY THE INTENSITY OF CELESTIAL RADIO SOURCES AS A FUNCTION OF TIME, DIFECTION, AND FREQUENCY (0.03 TO 20 MHZ). THREE RAPID-BURST RECEIVERS, TWO RYLE-VONGERG RECEIVERS, AND AN IMPEDANCE PROBE CONNECTED TO TWO 750-FT-LONG \*V\* ANTENNAS AND A 120-FT-LONG DIPULE ANTENNA WERE USED. THE SPACECRAFT WAS IN A LUNAR ORBIT.

ON 06/10/73. THE DATE OF THE LAST IDENTIFIED SFACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME - STEP FREQUENCY RADIOMETERS NSSCC 10 73-039A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. GREENEELT. MD

PI - R.G. STONE NASA-GSFC GREENEELT. MD

DI - R.R. WEBER NASA-GSFC GREENEELT. MD

DI - L. BROWN NASA-GSFC GREENBELT. MD

EXPERIMENT BRIEF DESCRIPTION

TWO RYLE-VONBERG RADIOMETERS WERE EACH CONNECTED TO A 750-FT, ACUTE ANGLE "V" ANTENNA" EACH RADIOMETER WAS SUCCESSIVELY TUNED TO NINE DIFFERENT FREQUENCIES IN THE BAND 0.03 TO 20 MHZ. PRECISE, AUTOMATIC, AND CONTINUOUS CALIBRATION WAS INHERENT IN THIS TYPE OF CESIGN.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- RAPID-EURST RECEIVERS

SO-APED-ET GI 2228

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR) PI - R.G. STONE NASA-GSFC GREENBELT. MD CI - J.K. ALEXANDER. JR. NASA~GSFC GREENBELT, MD OI - J. FAINBERG NASA-GSFC GREENEELT. ND 01 - J.F. CLARK NASA-GSFC GREENBELT. MD 01 - H. MAL ITS ON NASA-GSFC GREENBELT, MD

# EXPERIMENT ERIEF DESCRIPTION

A 32-CHANNEL STEP FREQUENCY RADIOMETER WAS CONNECTED TO EACH ANTENNA (2 'V' ANTENNAE, 75 C-FT LONG, I DIPOLE, 120-FT LONG) AND MEASURED THE AMPLITUDES, RATES OF CHANGE OF FREQUENCY, AND DECAY TIMES OF SOLAR BURSTS AND OTHER RAPIDLY VARYING NOISE IN THE 0.025 TO 16 MHZ BAND. OPERATING IN TWO SENSITIVITY MODES, THESE RECEIVERS MEASURED SIGNALS UP TO 60 CB ABOVE THE COSMIC BACK(ROUND LEVEL. THE 32 CHANNELS WERE CYCLED EVERY 1.28 SEC.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CAPACITANCE PROBE

NSSDC ID 73-039A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. GI=CTHER INVESTIGATOR) PI - R.G. STONE NASA-GSFC GREENEELT. MD 01 - J.L. DONLEY NASA~GSEC GREENBELT. MD DI - J.E. **CUTERIE** NA SA - GSF C GREENEELT. MD 01 - J.A. KANE NASA-GSEC GREENEELT. MD OI - R.C. SOMERLOCK NASA-GSEC GREENBELT, MD

## EXPERIMENT BRIEF DESCRIPTION

THE ANTENNA AND SPACECRAFT FUNCTIONED AS TWO CAPACITOR PLATES WITH THE AMBIENT PLASMA ACTING AS THE DIELECTRIC. FREQUENCY SHIFTS IN TWO COUPLED OSCILLATORS CONNECTED TO THE ANTENNA INDICATED CHANGES IN ANTENNA CAPACITANCE CAUSED BY VARIATIONS IN THE AMBIENT ELECTRON DENSITY.

EN 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL. AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

Planned Spacecraft and Experiments

# SECTION 2 - DESCRIPTIONS OF PLANNED SPACECRAFT AND EXPERIMENTS

Section 2 contains descriptions of all planned space science space-craft and experiments pertinent to this Report for which NSSDC has at least minimal documentation. This section is similar in format to Section 1. All descriptions included in this section are ordered alphabetically by NSSDC ID Code, which appears in the upper right-hand corner of the description.

The heading for each spacecraft description in this section includes a set of planned orbit parameters (orbit type, orbit period, apoapsis, periapsis, and inclination), a planned launch date, launch site, launch vehicle, spacecraft weight in orbit, spacecraft common and alternate names, funding country and agency, and spacecraft personnel (project manager and project scientist). The last reported status of the spacecraft project is given at the end of the spacecraft brief description and is repeated at the end of each experiment brief description. This status information is based on information received from the various spacecraft project offices and other sources. The spacecraft status is given as "APPROVED MISSION," or "PROPOSED MISSION." The header for an experiment entry indicates the experiment name and the name and address of each investigator associated with the experiment.

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## NATIONAL SPACE SCIENCE DATA CENTER PLANNED SPACECRAFT AND EXPERIMENTS

SPACECRAFT COMMON NAME- AD-A

ALTERNATE NAMES- DUAL AIR DENSITY EXFL-A, AD-A

PLANNED LAUNCH DATE- 05/00/75 SPACECRAFT WEIGHT IN CRBIT- V 40. KG

LAUNCH SITE- VANDENBERG AFE. UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY UNITED STATES

N AS A-05 S

PLANNED DRUIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERICO- 122. MIN APOAPSIS- 1500. KM ALT PERIAPSIS- 400. KM ALT INCLINATION- 90. DEG

SPACECRAFT PERSONNEL (PM=PRGJECT MANAGER, PS=FRGJECT SCIENTIST)

PM - J.E. CANADY, JR. NASA-LARC

HAMETON: 'VA

PS - E.J. PRIOR

NASA-LAFC

HAMPTON. VA

SPACECRAFT BRIEF DESCRIPTION

THE EXPERIMENT AC-A (DUAL AIR DENSITY EXPLORER A) WILL CONSIST OF A 76-CM-DIAM SPHERE DESIGNED TO YIELD GLOBAL DENSITY MEASUREMENTS OF THE UPPER THERMUSPHERE. THIS EXPERIMENT WILL BE PLACED IN A COPLANAR ORBIT WITH THE SECUND SATELLITE IN THE SYSTEM: AD-B (DUAL AIR DENSITY EXPLORER B); USING A SINGLE SCOUT LAUNCH VEHICLE. VALUES OF ATMOSPHERIC DENSITY WILL BE OBTAINED FROM SATELLITE CRAG ANALYSIS NEAR PERIGEE (APPROXIMATELY 400 KM). AND FROM COMPOSITION MEASUREMENTS TAKEN BY AN ENBOARD MASS SPECTROMETER. THE SATELLITE WILL SE EQUIPPED WITH A RADIC BEACON TO FACILITATE TRACKING. ALL DATA WILL BE TELEMETERED IN REAL TIME.

ON 12/00/72. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG DENSITY

NSSDC ID AD-A -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTHER INVESTIGATOR)

HAMPTON, VA

PI - G.M. KEATING NASA-LARC OI - E.J. PRIOR NASA-LARC

HAMFTEN. VA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DRAG DENSITY EXPERIMENT ON AD-A IS DESIGNED TO PROVIDE INDIRECT MEASUPEMENTS OF UPPER THERMOSPHERIC DENSITY NEAR SATELLITE PERIGEE (APPROXIMATELY 400 KM). THE EXPERIMENT WILL HAVE NO UNIQUE CHECARD HARDWARE. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL COSERVATIONS OF THE SATELLITE'S PUSITION. THE EXPERIMENT WILL YIELD SYSTEMATIC VALUES OF ATMOSPHERIC DENSITY AS A FUNCTION OF LATITUDE. SEASON, AND LOCAL SOLAR TIME.

UN 12/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - ATMOSPHERIC COMPOSITION MASS SPECTROMETER

NESDC ID AD-A -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHEF INVESTIGATOR) MINNEAPOLIS. MN U OF MINNESOTA PI - A.O.C. NIER U OF MINNESCTA MINNEAPOLIS, MN MAUERSBERGER 01 - K. HAMPTON. VA NASA-LARC PRIOR 01 - E.J.

EXPERIMENT BRIEF DESCRIPTION

THE MASS SPECTROMETER EXPERIMENT TO BE FLOWN ON AD-A IS DESIGNED TO PERFORM COMPOSITION MEASUREMENTS IN THE UPPER THERMCSPHERE (APPROXIMATELY 400 KM). THE INSTRUMENT WILL BE A DOUBLE-FOCUSING MATTAUCH-HERZOG SPECTROMETER. AND WILL MEASURE THE DISTRIBUTION OF SUCH ATMOSPHERIC CONSTITUENTS AS OXYGEN, NITROGEN, HELIUM, HYDROGEN, NECN, AND ARGON. ALL DATA WILL BE TRANSMITTED IN REAL TIME.

ON 12/00/72. THE SPACECRAFT MISSIGN WAS APPROVED.

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DUAL AIR DENSITY EXFL-8 ALTERNATE NAMES-

NSSDC ID AD-B

PLANNED LAUNCH DATE- 05/00/75 SPACECRAFT WEIGHT IN CREIT-

LAUNCH SITE- VANDENBERG AFB. UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY UNITED STATES

NASA-OSS

PLANNED ORBIT PARAMETERS

SPACECRAFT COMMON NAME- AD-8

ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 122. MIN APOAPSIS- 1500. KM ALT PERIAPSIS- 400. KM ALT INCLINATION-90 . DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST) NASA-LARC HAMPTON. VA

PM - J.E. CANADY, JR. HAMFTON. VA NASA-LARC PS - E.J. PRIOR

SPACECRAFT BRIEF DESCRIPTION

THE EXPERIMENT AD-8 (DUAL AIR DENSITY EXPLOSOR-8) WILL CONSIST OF A 3.65-M INFLATABLE SPHERE DESIGNED TO YIELD GLOBAL DENSITY MEASUREMENTS OF THE LOWER EXOSPIERE. THIS EXPERIMENT WILL BE PLACED IN A COPLANAR ORBIT WITH AD-A (DUAL AIR DENSITY EXPLORER A). THE GTHER SATELLITE IN THE SYSTEM. BY A SINGLE SCOUT LAUNCH VEHICLE. VALUES OF ATMOSPHERIC DENSITY WILL BE OBTAINED FROM SATELLITE CRAG ANALYSIS NEAR PERIGEE (APPROXIMATELY 700 KM), AND FROM COMPOSITION MEASUREMENTS TAKEN BY AN GNBOARD MASS SECTROMETER. THE SATELLITE WILL BE EQUIPPED WITH A RADIO BEACON TO FACILITATE TRACKING. ALL DATA WILL BE TELEMETERED IN REAL TIME.

ON 02/27/73. THE SPACECRAFT MISSION WAS APPROVED.

NESDC ID AB-B -01 EXPERIMENT NAME - ATMOSPHERIC DRAG DENSITY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) HAMPTON: VA NASA-LARC PI - G.M. KEATING

OI - E.J. PRIOR

NASA-LARC

HAMPTON. VA

#### EXPERIMENT BRIEF CESCRIPTION

THE ATMOSPHERIC DRAG DENSITY EXPERIMENT ON AD-B IS DESIGNED TO PROVIDE INDIRECT MEASUREMENTS OF LOWER EXOSPHERIC DENSITY NEAR SATELLITE PERIGES (APPROXIMATELY 700 KM). THE EXPERIMENT WILL HAVE NO UNIQUE ONBOARD HARDWARE. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. THE EXPERIMENT WILL YIELD SYSTEMATIC VALUES OF ATMOSPHERIC DENSITY AS A FUNCTION OF LATITUDE. SEASON. AND LOCAL SOLAR TIME.

ON 02/27/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION MASS
SPECTROMETER

NSSDC ID AD-B -02

## EXPERIMENT BRIEF DESCRIPTION

THE MASS SPECTROMETER EXPERIMENT TO BE FLOWN ON AC-B WILL PERFORM COMPOSITION MEASUREMENTS IN THE LOWER EXOSPHERE (APPROXIMATELY 700 KM). THE INSTRUMENT IS A COUBLE-FOCUSING MATTAUCH-FERZOG SPECTROMETER AND WILL MEASURE THE DISTRIBUTION OF SUCH ATMOSPHERIC CONSTITUENTS AS OXYGEN, NITROGEN, HELIUM, HYDROGEN, NEON, AND ARGON, ALL CATA WILL BE TRANSMITTED IN REAL TIME.

ON 02/27/73, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- AE-C ASSOC ID AE-C ALTERNATE NAMES- S 6E, PL-721C, ATMOSPHERE EXPLORER-C

PLANNED LAUNCH DATE- 12/00/73 SPACECRAFT WEIGHT IN ORBIT- 660. KG

LAUNCH SITE- VANDENEERG AFB. UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS

OUTTED STATES MASK-035

PLANNED GRBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 129. MIN

APCAPS IS - 4256. KM ALT PERIAPSIS- 157. KM ALT INCLINATION- 68.1 DEG

SPACE CRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.W. GRIMES NASA-GSFC GREENBELT. MD PS - N.W. SPENCER NASA-GSFC GREENBELT. MD

SPACECRAFT BRIEF DESCRIPTION

ONE OBJECTIVE OF AE-C WILL BE TO INVESTIGATE THE PHOTOCHEMICAL PROCESSES ACCOMPANYING THE ABSORPTION OF SOLAR UV RACIATION IN THE EARTH'S ATMOSPHERE BY MAKING CLOSELY COORDINATED MEASUREMENTS OF REACTING

CONSTITUENTS. THE MEASUREMENTS WILL BE ORIENTED PRIMARILY TO THE LARGELY UNEXPLORED LOW-ALT ITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SOLAR EUV RADIATION, NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, AIRGLOW EMISSIONS. PARTICLE FLUXES, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER CF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE. THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE. POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A PCM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE RECORDER MODE. AN ON-BOARD PROPULSION SYSTEM WILL BE USED FOR MAKING ALTITUDE CHANGES. THE SATELLITE IS EXPECTED TO HAVE A 1-YR LIFETIME. MORE CETAILS CAN BE FOUND ON PP. 263-269 CF "FADIO SCIENCE". VOL. B. NO. 4. APRIL 1973.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION NSSDC ID AE-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) GREENBELT. MD NASA-GSFC BRACE PI - L.H. GREENBELT. MD NASA-GSFC THEIS 01 - R.F.

## EXPERIMENT BRIEF DESCRIPTION

THE CYLINDRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT MEASURES THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTOOTH VOLTAGE PATTERN APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE. ELECTRON DENSITY AND ELECTRON TEMPERATURE CAN BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENCING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 23 CM FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTEND ANOTHER 10 CM FURTHER OUTWARD FROM THE END OF THE GUARD RING. TWO IDENTICAL PROCES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE), AND THE OTHER PROBE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES. WHICH PROVIDE TEMPERATURES AND DENSITIES. THESE CURVES WILL BE TELEMETERED.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG

NSSEC ID AE-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 01=0THER INVESTIGATOR) BECFORD. MA AFCRL PI - K.S.W. CHAMPION BEDFERD. #A AFCRL 01 - F.A. MARCOS

## EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE AXIS ACCELEROMETERS. TWG OF THE UNITS WILL LIE ALONG THE SPACECRAFT X AXIS. AND THE THIRD WILL BE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION.

THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE +12 GRAMS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER

NSSCC IE AE-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - J.P. DOERING JOHNS HOPKINS U EALTIMORE, MD

OI - C.O. BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MD

OI - J.C. ARMSTRONG APPLIED PHYSICS LAB SILVER SPRING, MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL EE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION TEMPERATURE

NESDC ID AE-C -04

# EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT. WILL MEASURE CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION. SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRICS BETWEEN THE INSTRUMENT APERTURE AND THE COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPOLISHED IN 3 SEC. IN THE NONSPINNING MODE, AN ADDITIONAL 3-SEC \*DUCT\* MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIGNAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 IONS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - SOLAR EUV FILTER PHOTOMETER

NESDC ID AE-C -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - D.F. HEATH NASA-GSFC GREENBELT, MD
OI - J. DSANTOWSKI NASA-GSFC GREENBELT, MD

# EXPERIMENT BRIEF CESCRIPTION

THE ATMOSPHERE EXPLORER C SOLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY DEJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC AESORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IDNIZATION RATES FOR MOLECULAR NITROGEN AND ATOMIC DXYGEN. SECONDARY DAJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTRUMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENDIX SPIRAL ELECTRON MULTIPLIERS. THREE PHOTOGODES. AND A STEPPED EIGHT-POSITION FILTER WHEEL THAT WILL CONTAIN SIX UNBACKED METALLIC FILTERS THAT ARE TRANSPARENT IN THE VICINITY OF THE PLASMA FREGUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION. A CALIBRATION POSITION, AND AN UPAQUE POSITION. SINCE EACH OF THE FILTERS IS WED TO EACH OF THE DETECTORS. THIS CONFIGURATION WILL PROVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT ORBITAL PARAMETERS. FOR MAXIMUM SUN VIEWING TIME FOR BOTH THE SPINNING AND THE EARTH-DRIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

DN 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCLAR EUV SPECTROPFOTOMETER

NSSCC IC AE-C -06

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR)

BEDFCRD . MA AFCRU HINTEREGGER PI - H.E. BEDFORD. MA AFCRL BEDO 01 - D.E. BECFCRD. MA AFCRL DI - L.A. HALL BEDFORD. MA AFCRL CHAGNEN DI - C.W.

# EXPERIMENT BRIEF CESCRIFTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS. WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MCDEFATE SPECTRAL RESCLUTION (2 A AT 300 A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NAFROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WILL BE PRINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN. WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CPEN SOURCE NEUTRAL MASS SPECTROMETER - NSSDC ID AE-C -07

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) U OF MINNESOTA FINNEAFCLIS . MN PI - A.O.C. NIER THE PHILLIPINES MANILA OBS OI - F.J. HEYDEN WINNEAFCLIS, MN L OF MINNESCIA 01 - K. MAUERSEERGER

EXPERIMENT BRIEF DESCRIPTION

THE DEJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL. DYNAMIC. AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING CIRECT IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 48 ATOMIC MASS UNITS (ANU). A DOUBLE-FOCUSING MATTAUCH -HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE IONS DIFFERING IN MASS BY A FACTOR OF EIGHT . I.E. . THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 48 AMU. AN OPEN ION SCURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY. A 100-MICROAMP BEAM OF 75-EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT. FOR MCLECULAR NITROGEN GAS. APPROXIMATELY 10 TO THE -E AMP OF RESOLVED MASS -28 IONS WILL APPEAR AT THE COLLECTOR WHEN THE PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MB). ON COMMAND. THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV. AT THIS LOWER ENERGY. THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN. AND THEREFORE. IT WILL BE POSSIBLE TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH AND LOW-MASS ICH COLLECTORS. A 50 PERCENT TRANSMISSION GRID. MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR. WILL INTERCEPT HALF THE BEAM. THIS GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER. AND THEREFORE. THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE POSSIBLE AND WILL BE SELECTED BY GROUND COMMAND. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM CHE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-UNLY MEMORY DEVICE. THERE ARE EIGHT OF THESE 32-STEP PROGRAMS WHICH FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES. SUCH AS MOLECULAR AND ATOMIC DXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON, (2) MINOR CONSTITUENT PROGRAMS THAT UNIT MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE. (3) A LOW MASS FROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU. AND (4) A NITRUGEN EXIDE PROGRAM THAT MEASURES THIS WASS -30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEFS. ABUNCANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY DNCE EACH HALF-SEC. COFRESPONDING TO A SPATIAL RESOLUTION OF ABOUT 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER IS APPROXIMATELY 2.5 BY 10 TC THE -14 TO 4.8 BY 10 TO THE -9 AMP AND FOR THE MULTIPLIER THE UPPER LIMIT IS 3 BY 10 TO THE +6 COUNTS/SEC. MCRE EXPERIMENT DETAILS CAN BE FOUND IN THE OPEN SCURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C. -C. AND -E. A. C. NIER ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP.271 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOSED SCURCE NEUTRAL MASS SECTROMETER INSID ID AE-C -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - D+T + PELZ NASA-GSFC GREENBELT + MD

DI - C+A + REBER NASA-GSFC GREENEELT + ND

DI - G+R + CARIGNAN U DF MICHIGAN ANN ARBCR + NI

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SEATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION. NEW INSIGHT INTO IN SITU WEASCREMENT TECHNIQUES WAY BE COTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE CHTAINED FROM OTHER ON-BOARD EXPERIMENTS, NAMELY -- OPEN SCURCE SPECTREMETER (AE-C -07). SOLAR -06). AND DENSITY-ACCELERCHETER (AE-C EUV SPECTROPHOTOMETER (AE-C THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE. A HYPERBOLIC RCD GUADRUPCLE ANALYZER. AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT: DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT-SENSITIVITY LIMITATIONS. ARE -- 250 KM FOR MOLECULAR CXYGEN. 300 KM FOR ARGON, 550 KM FOR MOLECULAR NITROGEN. 700 KM FOR ATOMIC CXYGEN. AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTIONS WILL BE AVAILABLE AND, EXPRESSED IN ATOMIC MASS UNITS (AMU). ARE -- (A) GEOPHYSICAL - 1. 2. 4. TCTAL, 16. 28, 32, SELECTED, 40. (B) ANALYTICAL - 12, 14. 18, 20. 22, 30, 44, CALIBRATE, ZERD, (C) INDIVIDUAL - SELECTED, SELECTED. . . (ANY MASS 1 TH 44), (C) SWEEP DIGITAL + 1, 2, 3, 4, 5, . . . 45 (IN 3/16 AMU STEPS), (E) SWEEP ANALOG - 2. 3. 4. 5. . . 45 (CENTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A EIFFERENT CONBINATION OF THE FIVE WASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE "NORMAL FORMAT" THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN. HELIUM. CIXYGEN, NITROGEN, AND ARGUN. ANOTHER FORMAT WILL BE CETIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION WILL BE DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM. MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK. WHILE THE INSTRUMENT IS FACING FORWARD. USING "NURMAL FÜRMAT". ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN. IN ORBIT, THE PRESEALED SPECTROMETER WILL BE CFENED. AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED ORIFICE INTO THE THERMALIZATION CHAMBER AND ION SCURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL ACCELERATE INTO A 14-STAGE ELECTRON MULTIPLIER, WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION. THE MULTIPLIER OUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT. AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE. SC THAT A MASS PEAK CHE THOUSANDTH THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE CYNAMIC RANGE REQUIRED. PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16) WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL DYNAMIC RANGE OF THE MEASUREMENTS IS GREATER THAN TO TO THE SEVENTH POWER, THERE IS PROVISION FOR THE INSTRUMENT DRIFICE TO BE COVERED DURING SPACECRAFT THRUSTER OPERATIONS. MCRE EXPERIMENT DETAILS CAN BE FOUND IN. "A NEUTRAL-ATMOSPHERE COMPOSITION EXFERIMENT FOR THE ATMOSPHERE EXPLORER -C, -D, -E, D. T. PELZ ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 272 (1973).

CN 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION

NSSDC ID AE-C -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - N.W. SPENCER

DI - G.R. CARIGNAN

U OF MICHIGAN

ANN AREGR. MI

# EXPERIMENT ERIEF DESCRIPTION .

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MCLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MCLECULAR NITROGEN CENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MCTION AND DRIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE. INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE OBTAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNCERTAKEN. USING A BAFFLE INSERTED IN FRONT OF THE CRIFTCE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESPUN MODE. THE BAFFLE WILL BE MADE TO OSCILLATE IN THE STEPWISE FASHION IN ORDER TO INTERRIPT THE FARTICLE STREAM SEEN BY THE DRIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ION SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION EEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SUURCE, THIS IGNIZED NITROGEN BEAM WILL BE DIRECTED FROM A QUADRUPOLE ANALYZER. TUNED TO PASS THOSE PARTICLES WHOSE MASS-TC-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE OUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE. THE NITROGEN DENSITY WILL BE MEASURED ONCE PER SPIN PERIOD. NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE BAFFLE OPERATING) AND ENCE FER SPIN PERIOD WITH EAFFLE OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MCDE. THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY. EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE BAFFLE EACH 2.0 SEC. IN THIS CASE. THE NITROGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE BAFFLE SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN DRBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN. \*THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT. \* N. W. SPENCER, ET AL., RADIU SCIENCE. VOL. 8, NO. 4, PP. 287-296 (1973).

ON 12/18/72, THE SPACECRAFT MISSICN WAS APERCUED.

EXPERIMENT NAME- MAGNET IC JON-MASS SPECTROMETER

NSSDC ID AE-C -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - J.H. HOFFMAN U OF TEXAS DALLAS. TX

### EXPERIMENT ERIEF DESCRIPTION

A MAGNETIC TON MASS SPECTROMETER WILL BE FLOWN TO NEASURE IN SITU THE CUNCENTRATIONS OF THE AMBIENT ION SPECIES IN THE MASS RANGE FROM 1 TO 90 ATUMIC MASS UNITS (AMU). MOUNTED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXIS. THE ENTRANCE APERTURE WILL FACE FORWARD WHEN THE SPACECRAFT IS IN THE DESPUN MODE. THE ELECTRIC AND MAGNETIC FIELDS WILL BE ARRANGED TO PRODUCE A MASS SPECTRUM ALONG THE FOCAL PLANE FOLLOWING THE MAGNETIC ANALYZER. THREE SLITS WILL BE PLACED ALONG THE FOCAL PLANE IN APPROPRIATE PLACES TO SIMULT ANEOUSLY COLLECT IONS IN THE MASS RATIOS 1 TO 4 TO 16 AMU. IONOSPHERIC IONS WILL BE ACCELERATED INTO THE ANALYZER SYSTEM BY A NEGATIVE VOLTAGE THAT WILL VARY FROM -1050 TO -225 V. THE THREE MASS RANGES MEASURED SIMULTANEOUSLY WILL BE 1 TO 4. 4 TO 16. AND 16 TO 64 AMU. FOLLOWING EACH SLIT WILL BE AN ELECTRON MULTIPLIER AND A LOGARITHMIC ELECTROMETER—AMPLIFIER

DETECTOR. THE DETECTOR OUTPUT COULD BE MEASURED DIRECTLY FOR AN ANALOG OUTPUT, OR IT COULD BE FED TO A "PEAK" CIRCUIT THAT WILL DETERMINE THE AMPLITUDE OF EACH PEAK IN THE SPECTRUM. ONLY THE AMPLITUDE OF EACH PEAK WILL BE TELEMETERED IN THE PRIMARY PEAKS MODE, AND IN THIS MODE THE TIME REQUIRED TO SIMULTANEOUSLY SWEEP ALL THREE MASS RANGES WILL BE 1 SEC. CTHER MODES OF OPERATION WILL BE POSSIBLE. IN THE ANALOG SHORT MODE, THE THREE MASS RANGES WILL BE SWEPT IN 3 SEC. ALTERNATING WITH 1-SEC "PEAKS" MODE SCANS. AN 8-SEC SWEEP TIME IS REQUIRED IN THE ANALOG LONG MODE, AGAIN ALTERNATING WITH 1-SEC PEAKS MODE SCAN. AN OPTION WILL EXIST IN THE LOCKED MODE TO CONTINUOUSLY MEASURE ANY SET OF MASS NUMBERS IN THE RATIO 1 TO 4 TO 16 TO GIVE HIGH SPATIAL RESOLUTION. THIS MODE, WHICH WILL ALSO INCLUDE AN CCCASIONAL 1-SEC SWEEP OF THE MASS SPECTRUM IN THE PEAKS MODE, WILL BE MOST USEFUL IN THE DESPUN SATELLITE ORIENTATION. MORE EXPERIMENT DETAIL CAN BE FOUND IN "THE MAGNETIC ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER", J. H. HOFFMAN, ET AL., "RADIO SCIENCE", VOL. 8, NO. 4, PP.315-322, (APRIL 1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BENNETT ION-MASS SPECTROMETER

NSSDC IC AE-C -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR) GREENBELT. MD BRINTON NASA-GSFC PI - H.C. NASA-GSFC GREENBELT , MO SCOTT OI - L.R. NASA-GSFC GREENBELT. MC PHARO 01 - M+W+ NASA-GSEC GREENBELT, MD TAYLOR, JR.

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FLOWN TO MEASURE. TRHCUGHOUT THE AE ORBIT. THE INDIVIDUAL CONCENTRATIONS OF ALL THERMAL ICH SPECIES IN THE MASS RANGE 1 TO 72 ATOMIC MASS UNITS (AMU). AND IN THE AMBIENT DENSITY RANGE FROM 5 IONS PER CC TO 5 MILLION IONS PER CC. ANY COMBINATION OF THE FOLLOWING THREE WASS RANGES, WHICH ARE EXPRESSED IN AMU. CAN BE SELECTED BY GROUND COMMAND --RANGE A - 4 TO 1. RANGE B - 18 TO 2. RANGE C - 72 TC 8. EACH RANGE WILL NURMALLY BE SCANNED IN 1.6 SEC (APPROXIMATELY 12 KM ALENG GREIT), BUT THE SCAN TIME PER HANGE CAN BE INCREASED TO 5.1 SECONDS BY COMMAND. NORMAL OPERATION WILL CONSIST IN SEQUENCE ABCABC (72 TO 1 AMU IN 4.8 SEC), BUT OTHER CUMBINATIONS SUCH AS BOBO AND COCC MAY BE USED. LABORATORY AND INFLIGHT DETERMINATION OF SPECTROMETER EFFICIENCY AND MASS CISCRIMINATION WILL PERMIT DIRECT CONVERSION OF MEASURED ION CURRENTS TO AMBIENT CUNCENTRATIONS. CORRELATION OF THESE MEASURED DATA WITH THE RESULTS FROM COMPANION EXPERIMENTS. 'ELECTROSTATIC PROBE (AE-C -01)' AND "RETARDING POTENTIAL ANALYZER (AE-C -04). SHOULD PERMIT INDIVIDUAL ION CONCENTRATIONS TO BE DETERMINED WITH AN ACCURACY OF PLUS OF MINUS 10 PERCENT. THE EXPERIMENT'S FOUR PRIMARY MECHANICAL COMPONENTS WILL BE --GUARD RING AND IUN-ANALYZER TUBE, COLLECTOR AND PREAMPLIFIER ASSEMBLY, VENT. AND MAIN ELECTRONICS HOUSING. THE GUARD RING WILL NORMALLY BE AT GROUND POTENTIAL, DUT IT CAN BE PLACED AT -6 V BY COMMAND IF DESIRABLE, E.G., IF THE SPACECRAFT ACQUIRED A POSITIVE CHARGE. A THREE-STAGE BENNETT TUBE WITH 7 TO 5 CYCLE DRIFT SPACES WILL BE FLOWN AND WILL BE MCCIFIED TO PERMIT ION CONCENTRATION MEASUREMENTS TO BE OBTAINED DOWN TO 120-KM ALTITUDE. SPECIFICALLY, A VENT WILL BE PROVIDED AT THE REAR OF THE SPECTROMETER, AND THE USUAL FLAT-CISK ION-CURRENT COLLECTOR WILL BE REFLACED WITH A STACK OF WIRE-MESH GRIDS. THE FREQUENCY OF THE 30 V PEAK-TO-PEAK R.F. VOLTAGE WILL. VARY WITH THE MASS RANGE MEASURED -- RANGE A - 10 MHZ. RANGE B - 5 MHZ. AND RANGE C - 2.5 MHZ. INTO THE VACUUM TIGHT ALUNINA-CERAMIC CYLINDRICAL ANALYZER TUBE A SERIES OF 16 PARALLEL TUNGSTEN-MESH GRIDS WILL BE BRAZED. THE BALANCE BETWEEN ION-CURRENT SENSITIVITY AND MASS-RESCLUTION IN A BENNETT SPECTROMETER MAY BE ALTERED BY CHANGING APPROPRIATE VOLTAGES. THESE VOLTAGE CHANGES CAN BE CONTROLLED INDEPENDENTLY BY GROUND COMMAND FOR EACH ONE OF THE THREE MASS RANGES. PRIMARY ANALOG INSTRUMENT CLIFUT WILL BE A COMPRESSED ION CURRENT SPECTRUM WHICH DISPLAYS THE FULL DYNAMIC RANGE OF THE AMPLIFIER SYSTEM ON A SINGLE TELEMETRY CHANNEL. ON-BOARD DATA PROCESSING WILL PROVIDE A READ-OUT OF PRIMARY EXPERIMENT DATA IN THE FORM OF TWO DIGITAL WORDS FOR EACH PEAK IN THE ION SPECTRUM. DNE EIGHT-BIT WORD WILL INDICATE PEAK AMPLITUDE (CURRENT) AND THE OTHER EIGHT-BIT WORD WILL IDENTIFY SWEEP POSITION. I.E.. SPECIES IDENTIFICATION. THE WORDS WILL EE READ CUT IN PAIRS AT THE MAIN FRAME TELEMETRY RATE OF 16 SAMPLES PER SECOND. INSTRUMENT CONFIGURATION SELECTED FOR A PARTICULAR PASS WILL DEPEND PRIMARILY ON THE DATA REQUIREMENTS OF THE SCIENCE PROBLEM UNDER INVESTIGATION AND ON THE SPACECRAFT SPIN MODE. MORE COMPLETE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER THE BENNETT ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER -C AND -E.\* H. C. BRINTON ET AL, RADIO SCIENCE, VOL. 8. NC. 4. FP. 323-332 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ELECTRONS

NSSDC ID AE-C . -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - R.A. HOFFMAN NASA-GSFC GREENEELT, MC
OI - D.S. EVANS NOAA BOULDER, CO

# EXPERIMENT BRIEF DESCRIPTION

THE DEJECTIVES OF THIS EXPERIMENT WILL BE TO STUDY (1) THE ENERGY INPUT TO THE THERMOSPHERE. (2) THE CHARACTERISTICS OF FIELD-ALIGNED CURRENTS IN THE TRANS-AURORAL ZONE. AND (3) THE MAGNETOSPHERIC SUBSTORM PRECIPITATION. THE INSTRUMENT, WHICH WILL MEASURE ELECTRONS IN THE ENERGY RANGE 0.2 TO 25 KEV. WILL CONSIST OF DETECTORS, EACH CONSISTING OF AN ELECTROSTATIC ANALYZER AND A CHANNEL ELECTRON MULTIPLIER. THERE WILL BE TWO MODES OF OPERATION. THE MONITOR MODE AND THE DATA MODE. IN THE MONITOR MODE. THERE WILL BE GOOD ENERGY RESOLUTION. MODERATE TEMPORAL RESOLUTION. AND REDUCED PITCH ANGLE MEASUREMENTS. THE DATA ACQUISITION IN THIS MODE WILL BE SIMULTANEOUS WITH THE PRIMARY AERONOMICAL AND IGNOSPHERIC EXPERIMENTS WHEN THE SATELLITE IS EITHER IN THE SPINNING OR DESPUN MODES. THE DATA MODE WILL PROVIDE SUFFICIENT ENERGY. PITCH ANGLE. AND TEMPORAL RESOLUTION TO COMPLETELY CHARACTERIZE THE ELECTRON RACIATION ENCOUNTERED IN THE AURORAL AND TRANS-AURORAL REGIONS. DATA ACQUISITION WILL OCCUR ON A LOW-DUTY CYCLE DURING TIMES WHEN THE HEAVY EXPERIMENT POWER LOAD IS OFF, ESPECIALLY IN THE DESPIN MODE TO ALLOW MEASUREMENT OF THE PITCH ANGLE. DURING SOME APOCEE PERIODS IN THE CESPIN MODE THE DETECTORS WILL LOOK DOWN TOWARD THE EARTH ALONG FIELD LINES.

UN 12/18/72, THE SPACECRAFT MISSIGN WAS APERCVED. .

EXPERIMENT NAME- NITRIC DXIDE AIRGLOW

NSSDC ID AE-C -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - C.A. BARTH U OF COLORADO BOULDER, CO

EXPERIMENT BRIEF CESCRIPTION

THIS ULTRAVIOLET NITRIC-DXIDE EXPERIMENT (LVNC) WILL CONSIST OF A TWO-CHANNEL FIXED-GRATING EBERT SPECTROMETER WHICH WILL MEASURE THE AIRGLOW

IN THE (1. 0) GAMMA BAND IN A 12-A REGICN CENTERED AT 2150 A. THE OBSERVED INTENSITY WILL BE PRODUCED BY RESCHANCE FLUGRESCENCE OF SUNLIGHT BY THE NITRIC-DXIDE MOLECULES IN THE INSTRUMENT'S FIELD OF VIEW. THE INTENSITY PROFILES OBTAINED WILL YIELD ALTITUDE PROFILES OF NITRIC-OXIDE CENSITY AS A FUNCTION OF TIME AND LOCATION. PROFILES WILL BE WEASUFED ALONG THE TRACK OF THE SATELLITE AT ALL TIMES WHEN IT IS ON THE SUNLIT SIDE OF THE EARTH. THE REMOTE SENSING CHARACTER OF THE UVNO EXPERIMENT WILL FERMIT MEASUREMENTS OF NITRIC-OXIDE TO BE MADE AT ALTITUDES BOTH ABOVE AND BELOW SATELLITE PERIGEE. AS THE SPACECRAFT SPINS. THE SPECTROMETER. WHICH LCCKS CUTWARD THROUGH THE RIM OF THE SATELLITE. WILL REPEATEDLY HAVE ITS FIELD OF VIEW CARRIED DOWN THROUGH THE ATMOSPHERE UNTO THE EARTH'S LINE, AND ALTITUDE PROFILES OF THE EMITTED AIRGLOW INTENSITY WILL BE OBTAINED. BELCW SCHE ALTITUDE THE MEASURED SIGNAL AT 2150 A WILL BE CONTAMINATED BY RAYLEIGH SCATTERED SUNLIGHT. TO CORRECT FOR THIS CONTAMINATION. A SECOND CHANNEL WILL MEASURE ONLY SCATTERED LIGHT INTENSITY IN A 12-A REGION CENTERED AT 2190 A. THE TWO CHANNELS WILL BE OPTICALLY AND ELECTRICALLY INDEPENDENT. NITRIC-CXIDE AIRGLOW INTENSITY WILL BE DETERMINED BY TAKING THE DIFFERENCE BETWEEN THESE TWO MEASUREMENTS. FROM THE COPRECTED SIGNAL, NITRIC-CXIDE DENSITY PROFILES WILL BE OBTAINED BETWEEN APPROXIMATELY 60 KM AND 250 KM. THE SENSOR'S SPHERICAL FUSED QUARTZ TELES COPE MIRROR WILL HAVE A 125-MM FOCAL LENGTH, AND WILL FOCUS INCIDENT LIGHT ON THE ENTRANCE SLIT OF THE SPECTRONETER. FROM THIS SLIT THE LIGHT WILL STRIKE ONE HALF OF THE EBERT MIRROR AND WILL BE COLLIMATED ONTO THE GRATING. THE 3600-LINES-PER-MM GRATING WILL RETURN IT COLLIMATED TO THE OTHER HALF OF THE EBERT MIRROR. AND THE LIGHT WILL BE FOCUSED ON TWO EXIT SLITS. THE SPECTROMETER FIELD OF VIEW IS ZERO DEG FIFTEEN MIN BY FOUR DEG THIRTY NINE MIN. IN NORMAL OPERATION EACH CHANNEL IS INTEGRATED FOR 20.8 MSEC AND IS READ OUT ALTERNATELY AT 10.4-MSEC INTERVALS. THE INSTRUMENT HAS LINEAR RESPONSE CHARACTERISTICS, AND THE OBSERVATION OF A 1-KR EMISSION RATE WILL PRODUCE. ON THE AVERAGE. 100 COUNTS PER INTEGRATION PERIOD IN THE 2150-A CHANNEL AND 50 COUNTS IN THE 2190-A CHANNEL. THE CAFAEILITY EXISTS TO INHIBIT OPERATION OF THE 2190-A CHANNEL. WHEN THIS IS DONE, THE INTEGRATION TIME OF THE 2150-A CHANNEL IS HALVED AND THE ALTITUDE RESOLUTION OF THE NITRIC-DXIDE MEASUREMENT IS DOUBLEC. THIS CAPABILITY WOULD BE USED WHEN IT IS DESIRED TO MEASURE THE NITRIC-DXIDE PROFILE WELL ABOVE THE RAYLEIGH SCATTERING LAYER IN THE ATMOSPHERE. THE CARK CURRENT CORRESPONDS TO ONE TO THREE COUNTS PER INTEGRATION PERIOD AND WILL NOT SIGNIFICANTLY AFFECT EXPERIMENT ACCURACY. THE INSTRUMENT IS PROTECTED AGAINST CONTAMINATION FROM INTERNAL SCATTERING OF OFF-AXIS UNDISPERSED LIGHT. THE CONTAMINATION IS NOT EXPECTED TO BE MUCH GREATER THAN 10 PERCENT OF THE AIRGLOW SIGNAL, AND IT CAN BE ACCURATELY SUBTRACTED OUT AFTER FLIGHT DATA FROM NEAR APCGEE HAS BEEN USED TO MEASURE THE INSTRUMENT'S SCATTERING FUNCTION. \*CRE EXPERIMENT DETAILS CAN BE FOUND IN. THE UV NITRIC-GXIDE EXPERIMENT FOR THE ATMOSPHERE EXPLORER\*, C. A. BARTH, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 379 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- AIRGLOW PROTOMETER

NSSCC IC AE-C -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: GI=CTHER INVESTIGATOR)
PI ~ P.8. HAYS U OF MICHIGAN ANN ARBER, MI
OI ~ G.G. SHEPHERD YORK U TORCNIC; CNIARIO. CANADA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONTAIN A FILTER PHOTOMETER DESIGNED TO MONITOR VARIOUS AIRGLOW AND AURORAL FEATURES WHICH LIE IN THE SPECTRAL RANGE BETWEEN 3000 A AND 7500 A. THE PRIMARY INFORMATION DOTAINED FROM THIS EXPERIMENT WILL BE THE RATES OF EXCITATION OF THE ATOMIC AND MOLECULAR CONSTITUENTS OF

.THE THERMOSPHERE. FOR THE AE+C MISSION, THE FOLLCHING SIX SPECIFIC LINES AND BANCS WERE CHOSEN FOR STUDY SINCE THEY PLAY AN IMPORTANT ROLE IN THE PHOTOCHEMICAL ENERGY BALANCE OF THE ATMOSPHERE -- 3371 A. 4278 A. 5200 A. 5577 A, 6300 A, AND 7319 TO 7330 A. THO OPTICAL SYSTEMS WILL VIEW AT RIGHT ANGLES TO EACH OTHER. EACH ONE WILL EMPLOY A COMBINATION OF A SIMPLE OBJECTIVE LENS AND FIELD STOP TO DEFINE THE FIELD OF VIEW. AND EACH WILL CONTAIN A MULTISTAGE LIGHT BAFFLE . THE WIDE-ANGLE HIGH SENSITIVITY SYSTEM (DESIGNATED CHANNEL 2) WILL HAVE A FIELD OF VIEW OF 3 DEG HALF-ANGLE . AND. WILL BE USEC TO MEASURE THE NIGHTGLOW. DAYGLOW ABOVE THE SATELLITE. AND OTHER WEAK EMISSION FEATURES. THE LESS SENSITIVE SYSTEM (DESIGNATED CHANNEL 1) WILL HAVE A RIELD OF VIEW OF APPROXIMATELY 3/4 DEG HALF-ANGLE. AND WILL BE USED FOR DAYGLOW AND NIGHTGLOW HORIZON MEASUREMENTS AS WELL AS DISCRETE AURURAL FEATURES WHICH SHOW STRONG SPATIAL GRADIENTS. FOR CHANNEL 1 THE THRESHOLD WILL BE APPROXIMATELY 15 RAYLEIGHS, AND FOR CHANNEL 2 IT WILL BE 0.5 RAYLEIGH. BOTH CPTICAL CHANNELS WILL HAVE A DIAMETER OF 2:2 CM. THEY WILL SHARE A FILTER WHEEL THAT WILL CONTAIN 6 INTERFERENCE FILTERS AT THE WAVELENGTHS IDENTIFIED ABOVE, AND TWO OTHER POSITIONS. ONE WILL BE A DARK POSITION FOR NOISE MEASUREMENTS, AND THE CTHER WILL BE A CALIBRATE POSITION. THE DYNAMIC RANGE OF THE INSTRUMENT WILL BE 10 TO THE 6 POWER RAYLEIGHS. IN ORDER THAT THE SENSORS BE ABLE TO RESPOND IN A FRACTION OF A SECOND TO LARGE CHANGES IN SURFACE ERIGHTNESS WITHOUT ANY NOTICEABLE ENHANCEMENT IN THE BACKGROUND COUNT RATE, EACH ONE WILL CONTAIN A 1/100 ATTENUATOR AND AN ELECTRONIC CIRCUIT TO BACK-BIAS THE CATHODE. WITH THESE PROTECTIVE FEATURES IT WILL BE POSSIBLE TO MEASURE A DARK FEATURE WITH NO APPARENT ENHANCEMENT IN BACKGROUND WITHIN 120 MSEC AFTER A DIRECT VIEW OF THE SUN. PHOTONS REACHING THE CATHODE WILL BE RECORDED USING A PULSE-COUNTING SYSTEM. THE INTEGRATION TIME WILL BE 33 MSEC FOR CHANNEL 1 AND 132 MSEC FOR CHANNEL 2. PRIMARY COMMAND AND TELEMETRY FORMATTING SYSTEMS WILL BE SHARED BY THE TWO CHANNELS. THE EXPERIMENT CAN BE COMMANDED INTO ANY DNE OF SEVERAL OPERATING MODES DEPENDING ON THE SCIENCE REQUIREMENTS AND SPACECRAFT ATTITUDE. FOR. EXAMPLE, IN THE FILTER-WHEEL MODE THE EXPERIMENT CAN GPERATE -- (1) FIXED FILTER - WHERE ANY ONE OF 8 POSSIBLE FILTER WHEEL POSITIONS IS IN PLACE. (2) FILTER CYCLING, WHERE FILTERS ARE SEQUENCED AT ONE OF THE FOLLOWING RATES (A) ONCE PER NADIR. (8) ONCE PER 2 NADIR. (C) ONCE PER 4 SEC. (D) ONCE PER 8 SEC. (E) ONCE PER 16 SEC. (F) ONCE PER 32 SEC. AND (3) IMPULSIVE GO STEP --IF LOGIC IS LOST. IN GENERAL. WHEN THE SPACECRAFT IS IN THE CRIENTED MODE. THE FILTER CYCLING COMMAND WILL PROBABLY BE USED. FOR AURORAL STUDIES AND SPATIALLY VARYING FEATURES. THE DESERVATIONS WILL FROBABLY BE MADE WITH FIXED FILTERS. WHEN SPACECRAFT IS IN THE SPINNING MODE. EITHER FIXED FILTER OR FILTER CHANGE ON NADIR WILL PROBABLY BE USED. FOR MORE EXPERIMENT DETAILS, SEE . THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER. P. B. HAYS. ET AL., RACIO SCIENCE, VOL. 8, NO. 4, PP. 369 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COLD CATFORE ION GAUGE

NSSDC ID AE-C -15

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) 01=CT+ER INVESTIGATOR)
PI - V.L. CARTER AEROSPACE CORP EL SEGUNDO. CA
01 - C.J. RICE AEROSPACE CORP EL SEGUNDO. CA

EXPERIMENT ERIEF DESCRIPTION

THE COLO CATHODE ION GAUGE TO BE FLOWN ON AE-C WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER. DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE. ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), WILL MEASURE ATMOSPHERIC

PRESSURE IN THE REGION BETWEEN 120 AND 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 MB. THE ESTIMATED ACCURACY OF THE FSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY SHAFED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED ORIFICE. A CATHODE NEAR GROUND POTENTIAL. AN ANDDE OPERATING AT ABOUT 1300 VDC. AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT. WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN-AXIS WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OFFERATED IN TWO MODES. SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE, THE PSA WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE PSA WILL FACE 30 DEG FRON THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED. ELT OBSERVED IN REAL TIME.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CAPACITANCE MANDMETER

NSSCC IC AE+C -16

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI = V.L. CARTER AEROSPACE CORP EL SEGUNDO, CA

DI = C.J. RICE AEROSPACE CORP EL SEGUNDO, CA

### EXPERIMENT GRIEF CESCRIPTION

THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-C WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER. DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR B (PSB), WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE FSE GAUGE WILL VARY FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PSB WILL CONSIST OF TWO SPHERICAL. THERMALLY CONTROLLED CHAMBERS. SEPARATED BY A THIN MEMBRANE STREACHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH IS MEASURED BY AN AC BRIDGE CIRCUIT. AIR WILL BE PERMITTED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS, THE WAKE-RAW PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

ON 12/18/72. THE SPACECPART MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME+ AE+D

ALTERNATE NAMES
S &C. PL-723B, ATMCSPHERE EXPLORER-D

PLANNED LAUNCH DATE- 03/00/75 SPACECRAFT WEIGHT IN DRBIT- 453.6 KG

LAUNCH SITE- VANCENBERG AFR, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NASA-OSS

PLANNED GRBIT PARAMETERS

DRBIT TYPE- GEOCENTRIC APOAPSIS- 4000.00 KM ALT ORBIT PERIOD- 129. MIN

PERIAPSIS- 150.000 KM ALT

INCLINATION-

98. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST) PM - D.W.

GRIMES PS - N.W. SPENCER NASA-GSFC NASA-GSFC

GREENBELT, MD

GREENBELT. ND

## SPACECRAFT BRIEF DESCRIPTION

ONE DEJECTIVE OF AE-D WILL BE TO INVESTIGATE THE CHEMICAL PROCESSES AND ENERGY TRANSFÉR MECHANISMS THAT CONTROL THE STRUCTURE AND BEHAVIOR OF THE EARTH'S ATMOSPHERE AND IGNOSPHERE THROUGH THE REGION OF HIGH SOLAR ENERGY ABSORPTION. MEASUREMENTS WILL BE CRIENTED FRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SCLAR EUV RADIATION. NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE. ELECTRON CONCENTRATION AND TEMPERATURE. ATMOSPHERIC EMISSIONS, PARTICLE FLUXES, IGNOSPHERE CURRENTS, AND THE PHOT DELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE: THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE. POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A PCM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE RECORDER MODE. AN ONBOARD PROPULSION SYSTEM WILL BE USED FOR MAKING ALTITUDE CHANGES. THE SPACECRAFT IS EXPECTED TO HAVE A 1-YR LIFETIME. MORE DETAILS CAN BE FOUND ON PP. 263-269 OF "RADIO SCIENCE", VOL. 8, NO. 4, APRIL, 1973.

ON 12/18/72, THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME - ELECTRON TEMPERATURE AND CONCENTRATION - NSSDC ID AE-D -0.1

EXPERIMENT PERSONNEL (FIRPRINCIPAL INVESTIGATOR, DIROTHER INVESTIGATOR)

PI - L.H. ERACE

NASA-GSEC

GREENEELT, NO

01 - K.F. THEIS

NASA - GSEC

GREENSELT. MD

### EXPERIMENT BRIEF DESCRIPTION

THE CYLINDRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT WILL MEASURE THE CURPENT FLOWING TO THE COLLECTOR. FOR A KNOWN SAWTOOTH VOLTAGE PATTERN TO SE APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE WILL BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 23 OF FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTENU ANOTHER 10 CM FURTHER FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SFIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE). AND THE OTHER FROM WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ENECARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WILL BE TELEMETERED.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

NESDC ID AE-D -0.2

EXPERIMENT NAME- ATMOSPHEDIC DRAG

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) BECFORD, MA AFCRL Pl - K.S.W. CHAMPIEN BECFORC. MA AF CRL 01 - F.A. MARCOS

# EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL DETAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TC 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPLRIMENT WILL CONSIST OF THREE SINGLE-AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE ALUNG THE SPACECRAFT X AXIS, AND THE THIRD WILL SE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REGUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYMAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE -12 GRAMS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOFLECTRON SPECTROMETER

-03 NSSCC IC AE-C

EXPERIMENT PERSONNEL (PI=PPINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) EALTINGRE, ND JOHNS HOPKINS t DOEP INC •4°C - 14 SILVER SPRING. NO APPLIED PHYSICS LAB BOSTRUM 01 - C.O. APPLIED PHYSICS LAB SILVER SPRING, MD ARMSTRONG 01 - 3-6

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOT TELECTRON ENERGY SPECTFUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISFHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION TEMPERATURE

NESDC ID AE~D -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) DALLAS. TX U OF TEXAS PI - W . 8 . HANS ON DALLAS. TX SW CHTR AD STUDIES OI - DaR. ZUCCARD DALLAS. TX. U OF TEXAS DI - S. SANT IN I

### EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP. A RETARDING POTENTIAL TYPE OF INSTRUMENT. WILL MEASURE CURPENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION. SUPRATHERMAL ELECTREN FLUXES. AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND FROM KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE

COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MEDE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TC 0 TC +23 V) COULD BE ACCOMPLISHED IN THREE SEC IN THE NUNSPINNING MODE, AN ACDITIONAL 3+SEC DUCT. MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL IUN CONCENTRATION CHANGES AS SMALL AS G.COI IONS/CC PER 130 M.ALONG TRACK TRAVEL COULD BE MADE.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR FUV FILTER PHOTOMETER

NSSDC ID AE-D -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - D.F. HEATH NASA-GSFC GREENBELT, MD
DI - J. OSANTOWSKI NASA-GSFC GREENBELT; MD

### EXPERIMENT BRIEF BESCRIPTION

THE ATMOSPHERE EXPLORER D SCLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY OBJECTIVES -- (1) TO MONITOR SCLAR EUV FLUX IN SIX ( WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC ABSURPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IUNIZATIUN KATES AS A FUNCTION DE ALTITUDE FOR MELECULAR NITROGEN AND ATOMIC DXYGEN. SECONDARY DEJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR 'THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENCIX SPIRAL ELECTRON MULTIPLIERS. THREE PHOTODICUES. AND AISTEPPED EIGHT-POSITION FILTER WHEEL THAT WILL CONTAIN SIX UNBACKED METALLIC FILTERS THAT WILL BE TRANSPARENT IN THE VICINITY OF THE FLASMA FREQUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION. A CALIBRATION POSITION, AND AN CHAQUE POSITION. SINCE EACH OF THE FILTERS WILL BE WED TO EACH OF THE DETECTORS. THIS CONFIGURATION WILL PRÉVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE FIGIOLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE: OPTIMIZED. DEPENDING ON THE SELECTED SPACECRAFT DRBITAL PARAMETERS. FOR MAXIMUN'SUN-VIEWING TIME FOR BOTH THE SFINNING AND THE EARTH-CRIENTED SPACECRAFT CPERATING MUCES. ACEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

CN 12/18/72, THE SPACECRAFT MISSIUN WAS APPROVED.

EXPERIMENT NAME~ SOLAR EUV SPECTROPHOTOMETER

NESDC ID AE-D -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - H.E. HINTEREGGER AFCRL BEDFORD, MA DI - D.E. eec.: AECRI BECFORD: NA 01 - L.A. HALL . AFCRL BEDFORD . MA 01 - C.W. CHAGNON AFCEL EECFORC: MA 01 - J.E. MANSON AFCAL BECFORC, MA

#### EXPERIMENT BRIEF DESCRIPTION

SIX GPAZING-INCIDENCE GRATING MONGCHROMATERS, WHICH: WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SCLAF EUV FLUX IN: THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL. RESOLUTION (2 A AT 300 A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE.

OR SELECTING SIX NAFROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MUNITURING. THE INSTRUMENT. WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION .

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER | NSSDC ID AE-D -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) MINNEAPOLIS. MN U OF MINNESOTA PI - A.B.C. NIER THE PHILLIPINES MANILA OBS 01 - F.J. HEYDEN MINNEAPOLIS . MN MAUERSEERGER U OF MINNESOTA 01 - K.

### EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE. BY PROVIDING DIRECT IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 48 ATOMIC MASS UNITS (AMU). A DOUBLE-FOCUSING MATTAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE IONS DIFFERING IN MASS BY A FACTOR OF EIGHT. I.E. . THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 48 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATCHIC GXYGEN. NORMALLY. A 100-MICROAMP BEAM OF 75-EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE DVERALL GEOMETRY OF THIS INSTRUMENT. FOR MOLECULAR NITROGEN GAS. APPROXIMATELY 10 TO THE -5 AMP OF RESOLVED MASS -28 IONS WILL APPEAR AT THE COLLECTOR WHEN THE PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MB). ON COMMAND, THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV. AT THIS LOWER ENERGY. THERE SHOULD NOT BE ANY DISSOCIATION OF MCLECULAR NITROGEN. AND THEREFORE. IT WILL BE POSSIBLE TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH AND LOW-MASS ION COLLECTORS. A 50-PERCENT TRANSMISSION GRIC. MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR. WILL INTERCEPT HALF THE BEAM. THIS GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER. AND THEREFURE. THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE REACOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MACE. SEVERAL MEASUREMENT MOCES WILL BE AVAILABLE AND WILL BE SELECTED BY GROUND COMMAND DURING FLIGHT. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. EIGHT OF THESE 32-STEP PROGRAMS FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL FROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES, SUCH AS MOLECULAR AND ATOMIC OXYGEN, MCLECULAR NITROGEN, HELILM, AND ARGON, (2) MINCR CONSTITUENT PROGRAPS THAT OMIT MEASUREMENTS OF THE COMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE. (3) A LOW-MASS FROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU. AND (4) A NITRUGEN OXIDE PROGRAM THAT MEASURES THIS MASS -30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN C.25-AMU STEFS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY ONCE EACH HALF-SEC. CORRESPONDING TO A SPATIAL RESOLUTION OF ABOUT 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER WILL BE APPROXIMATELY 2.5 BY 10 TO THE -14 TO 4.8 BY 10 TO THE -9 AMP, AND FOR THE MULTIPLIER THE UPPER LIMIT WILL BE 3 BY

10 TO THE +6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN THE OPEN SOURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C. -C. AND -E. A. O. NIER ET AL. RADIO SCIENCE, VOL. 8, NO. 4, PP.271 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-D -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - D.T. PELZ NASA-GSFC GREENELT. MD

OI - C.A. REBER NASA-GSFC GREENEELT. MD
OI - G.R. CARIGNAN U OF MICHIGAN ANN ARBOR. MI

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION. NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE DETAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE OBTAINED FROM OTHER ONBOARD EXPERIMENTS: NAMELY -- OPEN SOURCE SPECTROMETER (AE-D -07); SOLAR EUV SPECTROPHOTOMETER (AE-D -06), AND DENSITY-ACCELERCMETER (AE-D -02)-THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE. A HYPERBOLIC ROD QUADRUPOLE ANALYZER. AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF ME ASUREMENT. DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT SENSITIVITY LIMITATIONS. WILL BE -- 250 KM FOR MOLECULAR OXYGEN. 300 KM FOR ARGON. 550 KM FCR MOLECULAR NITROGEN. 7CG KM FOR ATCHIC DXYGEN. AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTION WILL BE AVAILABLE AND. EXPRESSED IN ATOMIC MASS UNITS (AMU). WILL BE -- (A) GEOPHYSICAL - 1. 2. 4. TUTAL, 16. 28. 32. SELECTED. 40, (B) ANALYTICAL - 12. 14. 18. 20, 22. 30, 44. CALIERATE, ZERO, (C) INDIVIDUAL - SELECTED, SELECTED. . . . (ANY MASS 1 TO 44), (C) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/16-AMU STEPS), (E) SWEEP ANALOG 2, 3, 4, 5, 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND. AND EACH ONE WILL CONTAIN A CIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE, WHEN OPERATING IN THE "NORMAL" FORMAT, THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN, HELIUM. OXYGEN. NITROGEN, AND ARGON. ANOTHER FORMAT WILL BE OFTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION IS DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK, WHILE THE INSTRUMENT IS FACING FORWARD. USING "NORMAL" FORMAT, ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN. IN ORBIT, THE PRESEALED SPECTFOMETER WILL BE OPENED, AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED CRIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL BE ACCELERATED INTO A 14-STAGE ELECTRON MULTIPLIER. WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION. THE MULTIPLIER CUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT. AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMEIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE, SO THAT A MASS PEAK CHE-THOUSANDTH THE AMPLITUDE OF AN ACJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC RANGE REQUIRED, PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16)

WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES.
AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED.
THE OVERALL RANGE OF THE MEASUREMENTS WILL BE GREATER THAN 10 TO THE SEVENTH
POWER. THERE IS A PROVISION FOR THE INSTRUMENT GRIFICE TO BE COVERED DURING
SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN "A
NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXFLORER -C.
+D. -E.\* D. T. PELZ ET AL. RADIO SCIENCE. VOL. 8, NO. 4. PP. 272 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION

NSSCC ID AE-D -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR).

PI - N.W. SPENCER NASA+GSFC GREENBELT. MD

DI - G.R. CARIGNAN U OF MICHIGAN ANN ARBOR. MI

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPEERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED DRIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE. INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE GETAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN, USING A BAFFLE INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESPUN MODE. THE BAFFLE WILL BE MADE TO OSCILLATE IN THE STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE DRIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT IGN SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITREGEN IN THE CHAMBER AND WILL PRODUCE AN ION BEAM DENSITY PROPORTIONAL TO THE NITHOGEN CHAMBER DENSITY. FROM THE SOURCE. THIS ICNIZED NITROGEN BEAM WILL BE DIRECTED FROM A QUADRUPOLE ANALYZER. TUNED TO PASS THOSE FARTICLES WHOSE MASS-TO-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE GUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE. THE NITROGEN DENSITY WILL BE MEASURED CACE PER SEIN PERIOD. NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE BAFFLE OPERATING) AND ONCE PER SPIN PERIOD WITH BAFFLE OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MODE. THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUCUSLY. EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE BAFFLE EACH 2.0 SEC. IN THIS CASE. THE NITROGEN TEMPERATURE WILL BE WEASURED EACH 2.0 SEC AS THE BAFFLE SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN "THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT," N. W. SPENCER. ET AL. RADIO SCIENCE, VOL. 8, NO. 4, PP. 287-296 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION COMPOSITION AND CONCENTRATION

NSSDC ID AE-D -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHEF INVESTIGATOR)
PI - J.H. HOFFMAN U OF TEXAS DALLAS, TX

### EXPERIMENT BRIEF DESCRIPTION

A MAGNETIC ION MASS SPECTROMETER WILL BE FLOWN TO MEASURE IN SITU THE CONCENTRATIONS OF THE AMBIENT ION SPECIES IN THE MASS RANGE FROM 1 TO 90 ATOMIC MASS UNITS (AMU). MOUNTED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXIS. THE ENTRANCE APERTURE WILL FACE FORWARD WHEN THE SPACEGRAFT IS IN THE DESPUN MODE. THE ELECTRIC AND MAGNETIC FIELDS WILL BE ARRANGED TO PRODUCE A MASS SPECTRUM ALONG THE FOCAL PLANE FOLLOWING THE MAGNETIC ANALYZER. THREE SLITS WILL BE PLACED ALONG THE FOCAL PLANE IN APPROPRIATE PLACES TO SIMULTANEOUSLY COLLECT IONS IN THE MASS RATIOS 1-4-16 AMU. ICHOSPHERIC IONS WILL BE ACCELERATED INTO THE ANALYZER SYSTEM BY A NEGATIVE VOLTAGE THAT WILL VARY FROM -1060 TO -225 V. THE THREE MASS RANGES NEASURED SINULTANEOUSLY WILL BE 1 TO 4. 4 TO 16. AND 16 TO 64 AML. FOLLOWING EACH SLIT WILL BE AN ELECTRON MULTIPLIER AND A LOGARITHMIC ELECTROMETER-AMPLIFIER DETECTOR. THE DETECTOR DUTPUT COULD BE MEASURED DIRECTLY FOR AN ANALOG OUTPUT. OR IT COULD BE FED TO A \*PEAK\* CIRCUIT THAT WILL DETERMINE THE AMPLITUDE OF EACH PEAK IN THE SPECTRUM. ONLY THE AMPLITUDE OF EACH PEAK WILL BE TELEMETERED IN THE PRIMARY PEAKS MCCE, AND IN THIS MODE THE TIME REQUIRED TO SIMULTANEOUSLY SWEEP ALL THREE MASS RANGES WILL BE 1 SEC. OTHER MODES OF OPERATION WILL BE POSSIBLE. IN THE ANALOG SHORT MODE: THE THREE MASS RANGES WILL BE SWEPT IN 3 SEC. ALTERNATING WITH 1-SEC \*PEAKS \* MODE SCANS. AN 8-SEC SWEEP TIME WILL BE REQUIRED IN THE ANALOG LONG MODE. AGAIN ALTERNATING WITH 1-SEC PEAKS MODE SCAN. AN OPTION WILL EXIST IN THE LOCKED MODE TO CONTINUOUSLY MEASURE ANY SET OF MASS NUMEERS IN THE RATIO 1-4-16 TO GIVE HIGH SPATIAL RESOLUTION. THIS MODE, WHICH WILL ALSO INCLUDE AN OCCASIONAL 1-SEC SMEEP OF THE MASS SPECTRUM IN THE PEAKS MODE, WILL BE MOST USEFUL IN THE DESPUN SATELLITE ORIENTATION. MORE EXPERIMENT DETAIL CAN BE FOUND IN THE MAGNETIC ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER: J. H. HOFFMAN. ET AL. RADIC SCIENCE. VOL. 8. NO. 4. FF.315-322. (APRIL 1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NITRIC OXIDE AIRGLOW

NSSDC ID AE-D -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - C.A. BARTH U OF COLORADO BOULDER. CO

### EXPERIMENT ERIEF CESCRIPTION

THIS ULTRAVIOLET NITRIC-OXIDE EXPERIMENT (UVNC) CONSISTS OF A TWO-CHANNEL FIXED-GRATING EBERT SPECTROMETER WHICH WILL MEASURE THE AIRGLOW IN THE (1. 0) GAMMA BAND IN A 12-A REGICN CENTERED AT 2150 A. THE OBSERVED INTENSITY IS FROTUCED BY RESONANCE FLUORESCENCE OF SUNLIGHT BY THE NITRIC-OXIDE MOLECULES IN THE INSTRUMENT'S FIELD OF VIEW. THE INTENSITY PROFILES OBTAINED WILL YIELD ALTITUDE PROFILES OF NITRIC-CXIDE DENSITY AS A FUNCTION OF TIME AND LOCATION. PROFILES WILL BE MEASURED ALONG THE TRACK OF THE SATELLITE AT ALL TIMES WHEN IT IS ON THE SUNLIT SIDE OF THE EARTH. THE REMOTE SENSING, CHARACTER OF THE UVNO EXPERIMENT PERMITS MEASUREMENTS OF NITRIC-OXIDE TO SE MACE AT ALTITUDES BOTH ABOVE AND BELOW SATELLITE PERIGEE. AS THE SPACECRAFT SPINS. THE SPECTROMETER. WHICH WILL LOCK OUTWARD THROUGH THE RIM OF THE SATELLITE, WILL REPEATEDLY HAVE ITS FIELD OF VIEW CARRIED DOWN THROUGH THE ATMOSPHERE ONTO THE EARTH'S LIMB, AND ALTITUDE PROFILES OF THE EMITTED AIRGLOW INTENSITY WILL BE DETAINED. BELOW SOME ALTITUDE THE MEASURED SIGNAL AT 2150 A WILL BE CONTAMINATED BY RAYLEIGH SCATTERED SUNLIGHT. TO CORRECT FOR THIS CONTAMINATION, A SECOND CHANNEL WILL MEASURE ONLY SCATTERED LIGHT INTENSITY IN A 12-A REGION CENTERED AT 2190 A. THE TWO

CHANNELS WILL BE OPTICALLY AND ELECTRICALLY INDEPENDENT. NITRIC-DAIDE AIRGLOW INTENSITY WILL BE DETERMINED BY TAKING THE DIFFERENCE BETWEEN THESE TWO MEASUREMENTS. FROM THE CORRECTED SIGNAL, NITRIC-CXICE CENSITY PROFILES WILL BE OBTAINED BETWEEN APPROXIMATELY 80 KM AND 250 KM. THE SENSOR'S SPHERICAL FUSED QUARTZ TELESCOPE MIRROR WILL HAVE A 125-MM FOCAL LENGTH. AND WILL FOCUS INCIDENT LIGHT ON THE ENTRANCE SLIT OF THE SPECTROMETER. FROM THIS SLIT THE LIGHT WILL STRIKE ONE-HALF OF THE EBERT MIRROR AND WILL BE COLLIMATED ONTO THE GRATING. THE 3500-LINES-PER-MM GRATING WILL RETURN THE LIGHT COLLIMATED TO THE OTHER HALF OF THE EBERT MIRROR. AND FOCUS IT ON TWO EXIT SLITS. THE SPECTROMETER FIELD OF VIEW WILL BE ZERE DEG FIFTEEN MIN BY FOUR DEG THIRTY NINE MIN. IN NORMAL OPERATION EACH CHANNEL WILL BE INTEGRATED FOR 20.8 MSEC AND READ GUT ALTERNATELY AT 10.4-MSEC INTERVALS. THE INSTRUMENT WILL HAVE LINEAR RESPONSE CHARACTERISTICS. AND THE OBSERVATION OF A 1-KR EMISSION RATE WILL PRODUCE, ON THE AVERAGE, 100 COUNTS PER INTEGRATION PERIOD IN THE 2150-A CHANNEL AND 60 COUNTS IN THE 2190-A CHANNEL. THE CAPABILITY WILL EXIST TO INHIBIT OPERATION OF THE 2190-A CHANNEL . WHEN THIS IS DONE . THE INTEGRATION TIME OF THE 2150-A CHANNEL IS HALVED AND THE ALTITUDE RESCLUTION OF THE NITRIC-GXICE MEASUREMENT IS DOUBLED. THIS CAPABILITY WOULD BE USED WHEN IT IS DESIRED TO MEASURE THE NITRIC-OXIDE PROFILE WELL ABOVE THE RAYLEIGH SCATTERING LAYER IN THE ATMOSPHERE. THE CARK CURRENT CORRESPONDS TO ONE TO THREE COUNTS PER INTEGRATION PERIOE AND WILL NOT SIGNIFICANTLY AFFECT EXPERIMENT ACCURACY. THE INSTRUMENT WILL BE PROTECTED AGAINST CONTAMINATION FROM INTERNAL SCATTERING OF UFF-AXIS UNDISPERSED LIGHT. THE CONTANINATION IS NOT EXPECTED TO BE MUCH GREATER THAN 10 PERCENT OF THE AIRGLOW SIGNAL, AND IT CAN BE ACCURATELY SUBTRACTED OUT AFTER FLIGHT DATA FROM NEAR APOGEE HAS BEEN USED TO MEASURE THE INSTRUMENT'S SCATTERING FUNCTION. MORE EXPERIMENT CETAILS CAN BE FOUND IN "THE UV NITRIC-CXIDE EXPERIMENT FOR THE ATMOSPHERE EXPLORER." C. A. BARTH, ET AL, RACIO SCIENCE, VOL. 8, NO. 4, PF. 379 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ELECTRONS

NSSDC ID AE-D -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CT+ER INVESTIGATOR)
PI - R.A. HOFFMAN NASA-GSFC GREENBELT. MD
DI - D.S. EVANS NOAA BOULDER, CO

### EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO STUDY (1) THE ENERGY INPUT TO THE THERMOSPHERE FROM ELECTRONS IN THE ENERGY RANGE 0.2 TC 25 KEV. (2) THE CHARACTERISTICS OF FIELD-ALIGNED CURRENTS IN THE TRANS-AURCRAL ZONE. AND (3) THE MAGNETOSPHERIC SUBSTORM PRECIPITATION. THE INSTRUMENT WILL CUNSIST OF 19 DETECTORS. EACH CONSISTING OF AN ELECTROSTATIC ANALYZER AND A CHANNEL ELECTRON MULTIPLIER. THERE WILL BE TWO MODES OF OPERATION, THE MONITOR MODE AND THE DATA MODE. IN THE MONITOR MODE, THERE WILL BE GOOD ENERGY RESOLUTION, MODERATE TEMPORAL RESOLUTION, AND REDUCED PITCH ANGLE MEASUREMENTS. THE DATA ACQUISITION WILL BE SIMULTANEOUS WITH THE PRIMARY AERONOMICAL AND TONOSPHERIC EXPERIMENTS WHEN THE SATELLITE IS EITHER IN THE SPINNING OR DESEUN MODES. THE DATA MODE WILL FROVIDE SUFFICIENT ENERGY. PITCH ANGLE. AND TEMPORAL RESOLUTION TO COMPLETELY CHARACTERIZE THE ELECTRON RADIATION ENCOUNTERED IN THE AURORAL AND TRANS-AUFORAL REGIONS. DATA ACQUISITION WILL DECUR ON A LOW-DUTY CYCLE DURING TIMES WHEN THE HEAVY EXPERIMENT POWER LOAD IS OFF. ESPECIALLY IN THE DESPIN MODE TO ALLOW MEASUREMENT OF THE PITCH ANGLE. DURING SOME APOGES PERIODS IN THE CESPIN MODE. THE DETECTORS WILL LOCK TOWARD THE EARTH ALONG FIELD LINES.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - A IRCLOW PHOTOMETER

NESCO ID AE-D -13

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - P. B. HAYS U OF MICHIGAN ANN ARBOR, MI

OI - G.G. SHEPHERD YORK U TORONTO, ONTARIO, CANADA

# EXPERIMENT GRIEF DESCRIPTION

THE VISIELE AIRCLOW EXPERIMENT WILL PROVIDE VOLUME EMISSIEN RATES FOR SEVERAL DAYGLOW: NIGHTGLOW: AND AURCRAL OFFICAL EMISSION FEATURES: A PHOTOMETER CONTAINING TWO SEPARATE OPTICAL CHANNELS WILL BE USED. SPECTRAL SELECTION WILL BE ACCOMPLISHED WITH A COMMON FILTER WHEEL THAT WILL CONTAIN SIX INTERFERENCE FILTERS AND A DARK AND CALIBRATE FOSITION. ANY ONE OF EIGHT POSSIBLE COMBINATIONS OF FILTERS CAN BE SELECTED FOR THE TWO CHANNELS THAT ARE SEPARATED IN ANGLE BY SO DEG. ONE CHANNEL WILL HAVE A LARGE FIELD OF VIEW (3 DEG HALF-ANGLE) FOR HIGH SENSITIVITY, NORMALLY POINTING TOWARD THE LOCAL ZENITH, AND THE SECOND CHANNEL WILL HAVE A SMALL FIELD OF VIEW (0.75 DEG HALF-ANGLE) FOR HIGH SPATIAL RESOLUTION, PCINTING TANGENT TO THE SURFACE OF THE EARTH WHEN THE SATELLITE IS IN THE DESPUN MODE. BOTH CHANNELS WILL BE PROTECTED FROM STRAY LIGHT CONTAMINATION DURING DAYTIME BY MULTISTAGE BAFFLE SYSTEMS. PHOTONS THAT HAVE BEEN SPECTRALLY AND SPATIALLY SELECTED WILL BE SENSED BY A PULSE-COUNTING PHOTOMULTIPLIER SYSTEM CAPABLE OF COUNTING AT A RATE OF 5 TIMES 10 TO THE 6 COUNTS/SEC. THE FILTERS CAN BE CHERATED IN SEVERAL MODES. E.G., FIXED FILTER AND ALTOMATIC FILTER CHANGES CAN BE SYNCHRONIZED EITHER TO SATELLITE URIENTATION OR TO A FIXED-TIME BASE. BASIC DATA ANALYSIS WILL YIELD VOLUME EMISSICH RATE ALONG THE SATELLITE TRACK. AND THE NARROW CHANNEL WILL PROVICE DATA TO OBTAIN VOLUME EMISSION RATES VS ALTITUDE THROUGHOUT THE ENTIRE PERIGEE REGION. MORE EXPERIMENT DETAILS CAN BE FOUND IN \*THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER.\* P. 8. HAYS, ET. AL., "FADIO SCIENCE." VOL. E. NO. 4. PP. 369 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CAPACITANCE MANDMETER

NSSCC ID AE-D -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTER INVESTIGATOR)

PI + V.L. CARTER AEROSPACE CORP EL SEGUNDO, CA

OI - C.J. RICE AEROSPACE CORP EL SEGUNDO, CA

### EXPERIMENT ERIEF DESCRIPTION

THE COLD CATHODE-ION GAUGE TO BE FLOWN ON AE-D IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA IN SPACECRAFT OFFRATION. HOWEVER, DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELERCMETER AND CAPACITANCE MANCMETER CATA TO EVALUATE SATELLITE DEAG FERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), WILL MEASURE ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 ME. THE ESTIMATED ACCURACY OF THE PSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY SHAPED SENSOR PACKAGEWILL.CONSIST OF A WEDGE-SHAPED CRIFICE, A CATHODE NEAR GROUND POTENTIAL, AN ANODE OPERATING AT ABOUT 1300 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1500 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF LONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND

WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT. WITH THE DRIFICE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. WHICH WILL BE NORMAL TO THE ORGITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES: SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SFINNING MODE. THE PSA WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE. THE PSA WILL FACE 30 DEG FROM THE DIFECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED, BUT COSERVED IN REAL TIME.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - COLD CATHODE ION GAUGE

NSSCC IC AE-D -15

EXPERIMENT PERSONNEL (PI=PPINCIPAL INVESTIGATOR, QI=CTHER INVESTIGATOR) EL SEGUNDO. CA AERGSPACE CORP CARTER PI - V.L. EL SEGUNDE, CA AERUSPACE CORP DI - C.J. RICE

## EXPERIMENT BRIEF DESCRIPTION

THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-D IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA UN SPACECRAFT OPERATIONS. HOWEVER. DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELERGMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR E (PSE). WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGINA BELOW 200 KM. THE ACCURACY OF THE PSE GAUGE WILL VARY FRUM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PSB WILL CONSIST OF TWO SPHERICAL. THERMALLY CONTROLLED CHANGERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RACIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CLOSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAFHRAGM AND AN ADJACENT ELECTRODE WHICH WILL BE MEASURED BY AN AC BRIDGE CIRCUIT. AIR WILL BE ALLUWED INTO ONE OF THE CHAMUERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS THE WAKE-FAN PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVULUTION.

ON 12/16/72. THE SPACECHAFT MISSION WAS APPREVED.

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SPACECRAFT COMMON NAME- AE-E S ED. ATMOSPHERE EXPLORER-E ALTERNATE NAMES-

NSSDC 1D AE-E

SPACECRAFT WEIGHT IN ORBIT-453.6 KG PLANNED LAUNCH DATE- 09/00/75

LAUNCH SITE- CAPE KENNECY. UNITED STATES

LAUNCH VEHICLE- DELTA

22. DEG

FUNDING AGENCY UNITEE STATES

NASA-OSS

PLANNED ORBIT PARAMETERS GREIT TYPE- GEOCENTRIC APGAPSIS - 4000.00 KM ALT

ORBIT PERIOD- 129. MIN PERIAPSIS- 150.000 KM ALT INCLINATION- 

#### SPACECRAFT BRIEF DESCRIPTION

LNE OBJECTIVE OF A6-E WILL BE TO INVESTIGATE THE CHEMICAL PROCESSES AND ENERGY TRANSFER MECHANISMS THAT CONTROL THE STRUCTURE AND BEHAVIOR OF THE EARTH'S ATMOSPHERE AND IGNOSPHERE THROUGH THE REGION OF HIGH SOLAR. ENERGY ABSORPTION. MEASUREMENTS WILL BE DETENTED FRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SCLAR EUV RADIATION. NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ICA COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, ATMOSPHERIC EMISSIONS, PARTICLE FLUXES, ICNOSPHERE CURRENTS, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF AFFROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE: THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE GREIT PLANE, POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A FOM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE RECORDER MODE. AN ENBOARD PROPULSION SYSTEM WILL BE USED FOR MAKING AUTITUDE CHANGES. THE SPACECRAFT IS EXPECTED TO HAVE A 1-YR LIFETIME. THORE DETAILS CAN BE FOUND ON PP. 253-269- OF. \*FADIC SCIENCE.\* VCL. 8. NO. 4. APRIL: 1973.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION - ASSOC TO AE-E +01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - L.H. BRACE NASA-GSFC GREENBELT, MD
DI - R.F. THEIS NASA-GSFC GREENEELT, MD

### EXPERIMENT BRIEF DESCRIPTION

THE CYLINGRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT WILL MEASURE THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTCOTH VOLTAGE PATTERN TO BE APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE WILL BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND AS OF FROM THE SPACECRAFT. AND THE ELECTRODE WILL EXTEND ANOTHER TO CM FURTHER FROM THE END OF THE GLARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT FLANE). AND THE CITER FROME WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO GNEDARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH WILL FROVIDE TEMFERATURES AND CENSITIES.

ON 12/18/72, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME - ATMOSPHERIC DRAG NSSDC 1D AE+E -02

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, CIECTHER INVESTIGATOR)

PI - K.S.W. CHAMPION MARCOS 01 - F.A.

AFCRL AFCRL.

BEDFORD. MA BEDFORD, MA

# EXPERIMENT ERIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE-AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE ALONG THE SPACECRAFT X AXIS. AND THE THIRD WILL EE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -5 TO 10 TO THE -12 GRAMS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER

NSSDC ID AE-E -03

EXPERIMENT FERSONNEL (FI=PRINCIPAL INVESTIGATOR) EALTIMORE. MC JOHNS HOPKINS U DOER ING PI - J.P. SILVER SPRING. MD APPLIED PHYSICS LAB 01 - C.O. BOSTROM SILVER SPRING. MD APPLIED PHYSICS LAB 01 - J.C. ARMSTRONG

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HE MIS PHERICAL-ELECTROST AT IC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

ON 12/18/72, THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME+ IGN TEMPERATURE

NESDC ID AE-E -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. GI=(THER INVESTIGATOR) U OF TEXAS DALLAS. TX HANSON PI - W.8. SW CNTR AD STUDIES DALLAS. TX DI - D.R. ZUCCARG DALLAS, TX. U OF TEXAS 01 - S. SANTINI

### EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, WILL MEASURE CURPENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE IGN TEMPERATURE, ICN DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES. AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CLRVE AND KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE CELLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPLISHED IN 3 SEC. IN THE NONSPINNING MODE: AN ADDITIONAL 3-SEC \*DUCT\* MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 ICNS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV FILTER PHOTOMETER

NSSCC ID AE-E -05

EXPERIMENT FERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=CTHER INVESTIGATOR)

PI - D.F. HEATH NASA-GSFC GREENEELT, MC

OI - J. OSANTOWSKI NASA-GSFC GREENEELT, MC

# EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERE EXPLORER E SOLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY DEJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC ABSORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IGNIZATION RATES AS A FUNCTION OF ALTITUDE FOR MOLECULAR NITROGEN AND ATOMIC OXYGEN. SECONDARY DEJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENDIX SPIRAL ELECTRON MULTIPLIERS. THREE PHOTODIOCES. AND A STEPPED EIGHT-FOSITION FILTER WHEEL THAT WILL CONTAIN SIX UNBACKED METALLIC FILTERS THAT WILL BE TRANSPARENT IN THE VICINITY OF THE FLASMA FREQUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION, A CALIBRATION POSITION. AND AN OPAQUE POSITION. SINCE EACH OF THE FILTERS WILL BE WED TO EACH OF THE DETECTORS, THIS CONFIGURATION WILL PROVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT DRBITAL PARAMETERS, FOR MAXIMUM SUN VIEWING TIME FOR BOTH THE SFIRNING AND THE EARTH-ORIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER

NSSCC IC AE-E -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - H.E. HINTEREGGER AFCRL BEDFORD. PA

OI - D.E. BEDO AFCRL BECFORD. NA

OI - L.A. HALL AFCRL BEDFORD. MA

OI - J.E. MANSON AFCRL BECFORD. NA

## EXPERIMENT ERIEF CESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS. WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL RESULUTION (2 A AT 30C A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MENITORING. THE INSTRUMENT. WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- OPEN SCURCE NEUTRAL MASS SPECTROMETER - NSSCC ID AE-E -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) MINNEAPOLIS: MN U OF MINNESOTA PI - A.O.C. NIER THE PHILLIPINES MANILA OBS **HEY DEN** OL - FoJo WINNEAFCLIS: MN U OF MINNESOTA MAUERSEERGER 01 - K.

# EXPERIMENT ERIEF CESCRIPTION

THE DEJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBLTE TO A STUDY OF THE CHEMICAL. CYNAMIC. AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PREVIDING DIRECT. IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 48 AND. A COUBLE-FOCUSING MATTAUCH-HERZUG MAGNETIC DEFLECTION MASS SPECTREMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE SIMULTANEOUSLY ICHS DIFFERING IN MASS BY A FACTOR OF EIGHT. I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 48 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC DAYGEN. NORMALLY. A 100 MICROAMPERE BEAM OF 75 EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT. APPROXIMATELY 10 TO THE -5 AMPERE OF RESCLVED MASS 28 IONS WILL APPEAR AT THE COLLECTOR FOR MOLECULAR NITROGEN GAS WHEN THE NOLECULAR NITROGEN PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 ME). THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV ON COMMAND. AT THIS LOWER ENERGY. THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN. AND, THEREFORE. IT WILL BE POSSIBLE TO TRY TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR ECTH FIGH- AND LOW-MASS ION COLLECTORS. A 50-PERCENT TRANSMISSION GRID. MOUNTED BETWEEN THE HIGH-MASS COLLECTUR SLIT AND ITS MULTIPLIER CETECTOR, WILL INTERCEPT HALF THE BEAM. THE GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER. AND, THEREFORE, THE CYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES THE LARGE FOR THE ELECTRON MULTIFLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL FERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE AVAILABLE AND WILL BE SELECTED BY GROUND COMMAND DURING FLIGHT. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE WASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. EIGHT OF THESE 32-STEP PROGRAMS FALL INTO THE FOLLOWING FOUR CATEGORIES --(1) NGRMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES SUCH AS MOLECULAR AND ATOMIC CXYGEN. MOLECULAR NITROGEN. HELIUM. AND ARGON. (2) MINOR CONSTITUENT PROGRAMS THAT OMIT NEASUREMENTS OF THE COMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIELE. (2) A LOW-MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU, AND (4) A NITROGEN DXIDE PROGRAM THAT MEASURES THIS MASS-30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY CACE EACH HALF-SEC. CORRESPONDING TO A SPATIAL RESOLUTION OF APPROXIMATELY 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF GPERATION FOR THE ELECTROMETER WILL BE APPROXIMATELY 2.6 TIMES 10 TO THE -16 TO 4.8 TIMES 10 TO THE -9 AMP, AND FOR THE MULTIPLIER THE UPPER LIMIT WILL BE 3 TIMES 10 TO THE 6 COUNTS/SEC. MORE EXPERIMENT CETAILS CAN BE FOUND IN THE OPEN SOURCE NEUTRAL-WASS SPECTROMETER ON ATMOSPHERE EXPLORER-C. -D. AND -E. A. C. NIER ET AL. RADIO SCIENCE, VOL. 8, NO. 4, PP. 271 (1973).

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SECTROMETER ASSCC TO AE-E -08

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR. DIEDTHER INVESTIGATOR)

PI - D.T. PELZ

NASA-GSEC NASA-GSEC

GREENBELT. MD

OI - C.A. REBER DI - G.R. CARIGNAN

U OF MICHIGAN

GREENEELT. NO ANN ARBOR. NI

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION. NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE OBTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE CETAINED FROM CTHER ONBOARD EXPERIMENTS. NAMELY -- OPEN SOURCE SPECTROMETER (AE-E EUV SPECTROPHOTOMETER (AE-E -06), AND DENSITY-ACCELEROMETER (AE-E THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-FLATED STAINLESS STEEL. THERMALIZING CHAMBER AND ION SOURCE, A HYPERBULIC RCD GLADRUPCLE ANALYZER. AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT, DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT SENSITIVITY LIMITATIONS, WILL BE -- 250 KM FOR MOLECULAR CXYGEN, 300 KM FOR ARGON. 550 KM FOR MOLECULAR NITROGEN. 700 KM FOR ATOMIC OXYGEN. AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTION WILL BE AVAILABLE AND. EXPRESSED IN ATOMIC MASS UNITS (AMU), WILL BE -- (A) GECPHYSICAL - 1. 2. 4. TUTAL. 16. 28. 32. SELECTED. 40. (B) ANALYTICAL - 32. 14. 18. 20. 22. 30. 44, CALIERATE, ZERD. (C) INDIVIDUAL - SELECTED. SELECTED. . (ANY MASS 1 TO 44), (C) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/15-AMJ STEPS). (E) SWEEP ANALOG 2. 3. 4. 5. 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A DIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE 'NORMAL' FORMAT: THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN. HELIUM. CXYGEN. NITROGEN. AND ARGON. ANCTHER FORMAT WILL BE OPTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION WILL BE DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK, WHILE THE INSTRUMENT IS FACING FORWARD. USING "NOFMAL" FORMAT, ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN. IN ORBIT, THE PRESEALED SPECTROMETER WILL BE OPENED. AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED CRIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE GLADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL BE ACCELERATED INTO A 14-STAGE ELECTRON MULTIPLIER. WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION. THE MULTIFLIEF CUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE CLIFUT PULSES WILL CONSTITUTE THE MEASUREMENT. AND THE COUNT RATE WILL BE FROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE. SO THAT A MASS PEAK CRE-THOUSANCTH THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC FANGE REQUIRED, PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 15-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16) WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IDNIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL DYNAMIC RANGE OF THE MEASUREMENTS WILL BE GREATER THAN 10 TO THE SEVENTH POWER. THERE IS PROVISION FOR THE INSTRUMENT CRIFICE TO BE COVERED

DURING SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN \*A NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXPLORER -C. -D. -E. C. T. PELZ ET AL, RADIC SCIENCE, VCL. 8, NC. 4, PP. 272 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRAT ION

NESDC ID AE-E -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) GREENEELT. MD NASA-GSFC SPENCER PI - N.W. ANN AREOR. MI U OF MICHIGAN CARIGNAN 01 - G.R.

## EXPERIMENT GRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE. INDEPENDENT OF SCALE PEIGHT . A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE DETAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN. USING A BAFFLE INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESFUN MODE. THE BAFFLE WILL HE MADE TO CSCILLATE IN A STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE DRIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ICH SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION SEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SOURCE, THIS ICNIZED NITROGEN BEAN WILL BE DIRECTED INTO A QUADRUPOLE ANALYZER. TUNED TO PASS THOSE PARTICLES WHOSE MASS-TC-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE CUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE: THE NITROGEN DENSITY WILL SE MEASURED ONCE PER SPIN PERICO: NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE BAFFLE OPERATING) AND ONCE PER SPIN PERIOD WITH EAFFLE OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY. EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE BAFFLE EACH 2.0 SEC. IN THIS CASE, THE NITHOGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE BAFFLE SCANS. THE SENSOR WILL BE VACUUM-SEALED FRIOR TO LAUNCH AND CRENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN. THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT, Th. W. SPENCER, ET AL., RACIO SCIENCE, VCL. 8. NO. 4. PP. 267-256 (1973).

UN 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION COMPUSITION AND CONCENTRATION NSSCC ID AE-E

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, CIECTHER INVESTIGATOR) GREENBELT. MD NASA-GSEC PI - H.C. BRINTON GREENBELT. MD SCOTT NASA-GSFC 01 - L.R. GREENEELT. ND NASA-GSEC CI - M.W. PHARE GREENBELT, MD TAYLOR: JR. NASA-GSFC .A.H - 10

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FLOWN TO MEASURE, THROUGHOUT THE AE ORBIT, THE INDIVIDUAL CONCENTRATIONS OF ALL THERMAL ICA SPECIES IN THE MASS RANGE 1 TO 72 ATCMIC MASS UNITS (AMU). AND IN THE AMBIENT DENSITY RANGE FROM 5 IONS PER CC TO 5 MILLION IONS PER CC. ANY COMBINATION OF THE FOLLOWING THREE MASS RANGES. WHICH ARE EXPRESSED IN AML. CAN BE SELECTED BY GROUND COMMAND --RANGE A - 4 TO 1. RANGE 8 - 18 TO 2. RANGE C - 72 TO 8. EACH RANGE WILL NORMALLY BE SCANNED IN 1.6 SEC (APPROXIMATELY 12 KM ALONG ORBIT). BUT THE SCAN TIME PER RANGE CAN BE INCREASED TO 5.1 SEC BY COMMAND. NORMAL OPERATION WILL CONSIST OF SEQUENCE ABCABC (72 TO 1 AMU IN 4.6 SEC). BUT CTHER COMBINATIONS SUCH AS BOBO AND COCC MAY BE USED. LABORATORY AND IN-FLIGHT DETERMINATION OF SPECTROMETER EFFICIENCY AND WASS DISCRIMINATION WILL PERMIT DIRECT CONVERSION OF MEASURED ION CURRENTS TO AMBIENT CONCENTRATIONS. CORRELATION OF THESE MEASURED DATA WITH THE RESULTS FROM COMPANION EXPERIMENTS. \* ELECTRUSTATIC PROBE (AE-E -01) \* AND \*RETARDING FCTENTIAL -04]. SHOULE PERMIT INDIVIDUAL ION CONCENTRATIONS TO BE ANALYZER (AE-E DETERMINED WITH AN ACCURACY OF PLUS OR MINUS 10 PERCENT. THE EXPERIMENT'S FOUR PRIMARY MECHANICAL COMPONENTS WILL BE -- GUARD RING AND ION-ANALYZER TUBE. CULLECTOR AND PREAMPLIFIER ASSEMBLY. VENT, AND MAIN ELECTRONICS HOUSING. THE GUARD RING WILL NORMALLY BE AT GROUND POTENTIAL. BUT IT CAN BE PLACED AT -6 VOLTS BY COMMAND IF DESTRAELE, E.G., IF THE SPACECRAFT ACQUIRED A POSITIVE CHARGE. A THREE-STAGE BENNET TUBE WITH 7 TO 5-CYCLE DRIFT SPACES WILL BE FLOWN. AND HAS EEEN MODIFIED TO PERMIT ION CONCENTRATION MEASUREMENTS TO SE OBTAINED DOWN TO 120 KM ALTITUDE. SPECIFICALLY, A VENT WILL BE PROVIDED AT THE REAR OF THE SPECTROMETER, AND THE USUAL FLAT-DISK ION-CUPRENT COLLECTOR WILL BE REPLACED BY A STACK OF WIRE-MESH GRIDS. THE FREQUENCY OF THE 30 V PEAK-TO-PEAK R.F. VOLTAGE WILL VARY WITH THE MASS RANGE MEASURED -- RANGE A - 10 MHZ. RANGE 8 - 5 MHZ. AND RANGE C - 2.5 MHZ. INTO THE VACUUM TIGHT ALUMINUM-CERAMIC CYLINDRICAL ANALYZER TUBE WILL BE A SERIES OF 16 PARALLEL TUNGSTEN-MESH GRIDS. THE BALANCE BETWEEN IDN-CURRENT SENSITIVITY AND MASS-RESOLUTION IN A BENNETT SPECTROMETER MAY BE ALTERED BY CHANGING APPROPRIATE VOLTAGES. THESE VOLTAGE CHANGES CAN BE CONTROLLED INDEPENDENTLY BY GROUND COMMAND FOR EACH THE CF THE THREE MASS RANGES. PRIMARY ANALOG INSTRUMENT DUTPUT WILL BE A COMPRESSED ION CURRENT SPECTRUM WHICH WILL DISPLAY THE FULL DYNAMIC RANGE OF THE ANFLIFIER SYSTEM ON A SINGLE TELÉMETRY CHANNEL. ONBOARD DATA PROCESSING WILL PROVIDE A REACOUT OF PRIMARY EXPERIMENT CATA IN THE FORM OF THE DIGITAL NERES FOR EACH PEAK IN THE ICH SPECTRUM. ONE EIGHT-BIT WORD WILL INDICATE FEAK AMPLITUDE (CURRENT) AND THE OTHER EIGHT-BIT WORD WILL IDENTIFY SWEEP POSITION. I.E., SPECIES IDENTIFICATION. THE WORDS WILL BE READ OUT IN PAIRS AT THE MAIN FRAME TELEMETRY RATE OF 16 SAMPLES PER SEC. THE INSTRUMENT CONFIGURATION SELECTED FOR A PARTICULAR PASS WILL DEPEND PRIMARILY ON THE DATA REQUIREMENTS OF THE SCIENCE PROBLEM UNDER INVESTIGATION AND ON THE SPACECRAFT SEIN MODE. MORE COMPLETE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER THE BENNETT ICH-MASS SPECTROMETER ON ATMOSPHERE EXPLORER -C AND -E. H. C. BRINTON ET AL. RADIO SCIENCE, VUL. 8, NO. 4, PP. 323-338 (1973).

DN 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- AIRGLOW PHOTOMETER

NSSDC IC AE-E -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR)
PI - P.E. HAYS U GF MICHIGAN ANN ARBOR, NI
OI - G.G. SHEPHERO YORK U DOWNSVIEW, CATARIO. CANADA

# EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE VOLUME EMISSION RATES FOR SEVERAL DAYGLOW AND NIGHTGLOW OPTICAL EMISSION FEATURES. A PHOTOMETER WILL BE USED. WHICH WILL CONTAIN TWO SEPARATE OPTICAL CHANNELS. SPECTRAL SELECTION WILL BE ACCUMPLISHED WITH A FILTER WHEEL THAT WILL CONTAIN SIX INTERFERENCE FILTERS AND A DARK AND (ALIERATE POSITION. THE TWO CHANNELS WILL BE SEPARATED IN ANGLE BY 90 DEG. ONE CHANNEL WILL HAVE A 3-DEG HALF-ANGLE CONE FIELD OF VIEW FUR HIGH SENSITIVITY AND WILL NORMALLY POINT TOWARD THE LOCAL ZENITH. THE SECOND CHANNEL WILL HAVE A FIELD OF VIEW OF C.75-DEG HALF-ANGLE CONE FOR HIGH SPATIAL RESOLUTION POINTING TANGENT TO THE SURFACE OF THE EARTH WHEN THE SATELLITE IS IN THE ORIGINED MODE. BOTH CHANNELS WILL BE PROTECTED FROM STRAY LIGHT CONTAMINATION DURING THE DAYTIME WITH MULTISTAGE BAFFLE SYSTEMS. ENTERING PHOTONS WILL BE MEASURED WITH A PULSE COUNTING PHOTONULTIPLIER SYSTEM CAPABLE OF COUNTING AT A RATE OF & TIMES 10 TO THE 6 COUNTS/SEC. THE SYSTEM DESIGN WILL FERMIT THE PHOTOMETERS TO MAKE VALID DAYGLOW MEASUREMENTS WITHIN 200 MSEC AFTER HAVING THE SUN IN THE FIELD OF VIEW. FILTERS CAN BE OPERATED IN SEVERAL MODES INCLUCING FIXED FILTER AND AUTOMATIC FILTER CHANGE SYNCHRUNIZED TO SATELLITE ORIENTATION. THE TWO SEPARATE OFFICAL CHANNELS WILL BE MONITURED AT TIME INTERVALS CONSISTENT WITH THEIR ANGULAR RESOLUTION IN THE SPINNING MODE. THE NARROW CHANNEL WILL HAVE AN INTEGRATION PERIOD OF 30 MSEC AND THE WIDE CHANNEL A PERICO OF 120 MSEC. BASIC DATA ANALYSIS WILL YIELD THE VOLUME EMISSION RATE ALDNG THE SATELLITE TRACK, AND THE NARROW CHANNEL WILL PROVIDE VOLUME EMISSION RATES VS ALTITUDE THROUGHOUT THE ENTIRE PERIGEE REGION. MORE EXPERIMENT DETAILS CAN BE FOUND IN THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER, P. E. HAYES, ET AL. RADIO SCIENCE, VOL. 8. ND. 4. PF. 365 (1973).

ON 12/18/72. THE SPACECHAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- CAPACITANCE MANOMETER

-12 NSSDC ID AE-E

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) EL SEGUNDO: CA AEROSPACE CCRF PI - V.L. CARTER AEROSPACE CORF EL SEGUNDO: CA SOIR DI - CaJ.

# EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE-ION GAUGE TO BE FLOWN ON AF-E WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT CRERATION. HOWEVER. DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELERCHETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA). WILL MEASURE ATMOSPHERIC PRESSURE IN THE RECION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 MB. THE ESTIMATED ACCURACY OF THE PSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY-SHAPED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED CRIFICE. A CATHODE NEAR GROUND POTENTIAL. AN ANODE OPERATING AT ABOUT 1300 VDC. AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GALES. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF JUN 12 ING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE IGN CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT, WITH THE BRIFICE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES, SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE: THE PSA WILL ALTERNATELY SAMPLE THE RAW AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE: THE PSA WILL FACE 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED. BUT DESERVED IN REAL TIME.

ON 12/18/72, THE SPACECRAFT MISSION WAS AFFREVED.

EXPERIMENT NAME- COLD CATHOLE ION GAUGE

NSSOC ID AE-E

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CI=OTHER INVESTIGATOR) PI - V.L. CARTER AEROSPACE CORP EL SEGUNDO+ CA 01 - C.J. 3**31**8 AEROSPACE CORF EL SEGUNCO, CA

EXPERIMENT ERIEF CESCRIPTION

THE CAPACITANCE MANDMETER TO BE FLOWN ON AE-E IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVICE DATA ON SPACEGRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROWETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANDMETER, ALSO REFERRED TO AS PRESSURE SENSOR & (PSE). WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PSB GAUGE WILL VARY FROM AECUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PSB WILL CONSIST OF TWO SPHERICAL, THERMALLY CONTROLLED CHANGERS, SEFARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAFHRAGM AND AN ADJACENT ELECTRODE WHICH WILL BE MEASURED BY AN AC BRIDGE CIRCUIT. AIR WILL BE ALLOWED INTO DNE OF THE CHAMBERS TERCUCH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS THE WAKE-RAM PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

SPACECRAFT COMMON NAME - AEROS-E ALTERNATE NAMES -

NESCC ID AERCS-B

PLANNED LAUNCH DATE- 07/00/74 SPACECRAFT WEIGHT IN CREIT-

LAUNCH SITE- VANCENBERG AFB. UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

FEL. REP. OF GERNANY UNKNOWN

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

DEBIT PERICD- 95. NIN

960. KM ALT PERIAPSIS- 240. KM ALT INCLINATION-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

WAGNER: JR. NASA-GSFC PM - C.L. PM - H.

NASA-GSFC

GREENBELT. MD

SCHREIBER, JR. PS - P.

GSCHAFT FLER WELTFORSO BONN. W. GERMANY

LAEMMERZAHL

M.PLANCK INST.HEIDELEG HEIDLEBERG, W. GERMANY

PS - S.J. BAUER

GREENBELT, MD

SPACECRAFT ERIEF DESCRIPTION .

THE AEROS & SATELLITE WILL HAVE A CYLINDRICAL SHAPE. A DIAMETER OF 0.914 M. AND A FEIGHT OF 0.710 M. IT WILL BE LAUNCHED INTO AN ELLIPTICAL. POLAR, NEARLY SUN-SYNCHRONOUS EARTH ORBIT. THE SPACECRAFT WILL BE SPIN-STABILIZED AT 10 RPM AND ORIENTED WITH THE SFIN AXIS TOWARD THE SUNSTHE PURPOSE OF THE MISSION WILL BE TO STUCY THE STATE AND BEHAVIOR OF THE UPPER ATMOSPHERE AND IONOSPHERIC F RADIATION. ESPECIALLY WITH REGARD TO THE INFLUENCE OF THE SOLAR ULTRAVIOLET REGION. FIVE EXFERIMENTS WILL PROVIDE DATA WHICH WILL INCLUCE THE TEMPERATURE AND DENSITY OF ELECTRONS, IONS. AND NEUTRAL PARTICLES. THE COMPOSITION OF IONS AND NEUTRAL PARTICLES. AND SOLAR ULTRAVIOLET FLUX.

ON 09/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MASS SPECTROMETER (MS)

NSSCC IC AEROS-8-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=CTHER INVESTIGATOR)

PI - D.K.H. KRANKOWSKY M.PLANCK INST.HEIDELEG HEIDELBERG. W. GERMANY

OI - P. LAEMMERZAHL M.PLANCK INST.HEIDELBG HEIDELBERG. W. GERMANY

### EXPERIMENT ERIEF CESCRIFTION

THIS EXPERIMENT WILL BE FLOWN TO PROVIDE MEASUREMENTS OF NEUTRAL AND IONIZED ATMOSPHERIC SPECIES IN THE MASS RANGE FROM 1 TO 44 AMU. THE QUADRUPOLE MASS ANALYZER. WITH ITS "SEMI-OPEN" IEN SOURCE, WILL BE SEALED UNDER VACUUM AND OPENED IN ORBIT. FOR AN ATMOSPHERE WITH AN EXOSPHERIC TEMPERATURE OF APPRIXIMATELY 1500 DEG K. THE UPPER ALTITUDE LIMITS OF NEUTRAL MEASUREMENTS FOR DIFFERENT GAS SPECIES WILL BE -- MOLECULAR NITROGEN - 660 km, MOLECULAR DXYGEN - 500 km, ATGMIC DXYGEN - 800 km. ARGEN - 250 km, AND HELIUM - 880 KM. ION DENSITIES FROM 1 FER CC TC 10 TC THE 6 PER CC CAN BE MEASURED THROUGHOUT THE CRBIT. THE ICH SOURCE WILL BE OPERATED IN TWO MCDES. NEUTFAL CAS SPECIES WILL BE PARTLY ICNIZED BY A REGULATED 100-MICROAMPERE FEAM OF 75-EV ELECTRONS PRODUCED BY EITHER OF TWO REDUNDANT HOT FILAMENTS THAT CAN BE SELECTED BY GROUND COMMAND. THE ICAS WILL BE FOCUSED INTO THE MASS ANALYZER BY AN ION LENS SYSTEM COMPOSED OF A REPELLING GRID AND TWO ACCELERATION LENSES. IN THE ION MODE. THE AMBIENT IONS DRIFTING INTO THE ION SOURCE REGION WILL BE ATTRACTED BY A NEGATIVELY-ELASED GRID AND SUBSEQUENTLY FOCUSED INTO THE ANALYZER. THE MASS RESOLUTION WILL BE ADJUSTED TO BE 30 , AND A SWEEP THROUGH THE ENTIRE MASS RANGE WILL TAKE 1.22 SEC. AFTER LEAVING THE MASS ANALYZER. THE INCIVIDUAL ICH CURRENTS WILL BE DETECTED BY A PARTICLE MULTIPLIER FOLLOWED BY A LOGARITHMIC ELECTRONETER. AND BY A GRIC CURRENT FED INTO A LINEAR ELECTROMETER. THE VOLTAGE DUTPUT OF THE LOGARITHMIC ELECTROPETER WILL REPRESENT A QUANTITATIVE MEASURE OF THE CORRESPONDING PARTICLE NUMBER DENSITIES OF NEUTRALS WITHIN THE 10% SOURCE. THE VOLTAGE OUTPUT OF THE LINEAR ELECTROMETER WILL REPRESENT A QUANTITATIVE MEASURE OF THE CURRESPONDING ION CURRENT (IGNS/SEC) OF AMBIENT IONS ENTERING THE EQUIPMENT. THE UPPER LIMIT OF CURRENT THAT CAN BE MEASURED BY THE LOG AMPLIFIER WILL BE 5 TIMES 10 TO THE -6 AMP, CORRESPONDING TO A O-V TELEMETRY DUTPUT SIGNAL. AUTOMATIC CALIBRATION AND REZEROING SIGNALS WILL BE INCLUDED. THE EXPERIMENT WILL WEIGH 7.0 KG. AND THE AVERAGE POWER DISSIPATED CVER AN ORBIT WILL BE & W.

UN 09/00/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- ENERGY DISTRIBUTION OF IONS AND ELECTRONS

NESDC ID AERCS-8-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - K. SPENNER 01 - A. CUMBS

WKG GP SPC PHYS RES FREIBURG. W. GERMANY .

WKG GP SPC PHYS RES FREIBURG . W. GERMANY

EXPERIMENT BRIEF CESCRIPTION

A RETARCING POTENTIAL ANALYZER WILL MEASURE THE ENERGY DISTRIBUTION OF ELECTRONS AND IONS. THE CORRESPONDING TEMPERATURES CAN BE DERIVED FROM THESE DISTRIBUTIONS. THE EXPERIMENT WILL OPERATE IN AN ELECTRON MODE AND IN AN ION MODE. THE INSTRUMENT WILL BE ESSENTIALLY A COLLECTOR. SHIELDED BY PARALLEL PLANE GRIDS. BY SWEEPING THE RETARDING VOLTAGE OF THE GRIC. THE ENERGY SPECTRA OF THE IUNOSPHERIC CHARGED PARTICLES CAN SE OBTAINED. THE PARTICLES WILL ONLY PASS THROUGH THE GRID AND REACH THE COLLECTOR IF THEIR KINETIC: ENERGY EXCEEDS THE RETARDING POTENTIAL.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON CONCENTRATION IN THE IONOSPHERE NSSDC ID AERES-8-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR) PI - E. NESKE WKG GP SPC PHYS RES - FREIBLEG, W. GERMANY 01 - R. KIST WKG GP SPC PHYS RES FREIEURG. W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE IMPEDANCE PROBE AND VEHICLE BODY WILL COMPRISE TWO PLATES OF A CONDENSER. IMPERANCE CHANGES DUE TO THE CHANGE IN DIELECTRIC (PLASMA) CHARACTERISTICS OF THE CONDENSER WILL BE OBSERVED BY MEASURING RESCHANCE FREQUENCIES BETWEEN THE CAPACITATOR AND VARIABLE FEEDING FREQUENCIES. THE ELECTRUM DENSITY CAN BE COMPUTED FROM THE OBSERVED RESCNANCE FREQUENCY. FREQUENCIES WILL RANGE FROM 0.6 TO 10 MHZ. WHICH WILL CORRESPOND TO ELECTRON DENSITIES FROM 5 X 10E3 TO 10E6 ELECTRONS/CM CUBED.

ON 09/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUX AND SPECTRAL DISTRIBUTION OF SGLAR NSSCC ID AEROS-8-04 EUV RAD AND THEIR TEMP AND SPATIAL VAR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - G. SCHMIDTKE WKG GP SPC PHYS RES FREIBURG, W. GERMANY 01 - W. SCHWEIZER WKG GP SPC PHYS RES FREIBURG. W. GERMANY

EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT WILL CONSIST OF A GRATING SPECTROMETER. A SOLAR COLLIMATOR, AND A PHOTOMULTIPLIER. IT WILL OPERATE IN 2 CHANNELS. 150 TO 510 A. AND 300 TO 1070 A, AND WILL BE USED TO MEASURE THE FLUX AND SPECTRAL DISTRIBUTION OF THE SCLAR ELV RADIATION AND ITS TEMPORAL AND SPATIAL VARIATIONS.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT

NSSCC IC AEROS-8-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, QI=CTHER INVESTIGATOR)

GREENBELT . MD PI - N.W. NASA-GSFC SPENCER NASA-GSFC NASA-GSFC GREENBELT. MD GREENBELT. MD 01 - D.T. PELZ 01 - G.P. NEWTON ANN ARBOR, MI U OF MICHIGAN OI - G.R. CARIGNAN NASA-GSFC GREENEELT. NO QI - H.B. NIEMANN

# EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE IN SITU MEASUREMENTS OF THE TOTAL GAS DENSITY. THE KINETIC TEMPERATURE OF MCLECULAR NITROGEN IN THE THERMOSPHERE. AND THE MOLECULAR NITROGEN DENSITY. THE USEFUL ALTITUDE RANGE OF THE EXPERIMENT WILL SE DETERMINED AT THE UPPER LINIT BY THE SIGNAL-TO-NOISE RATIO: AND AT THE LOWER LIMIT BY THE MAXIMUM INTERNAL NUMBER DENSITY AT WHICH THE ION SCURCE CAN PROPERLY OPERATE ON BY THE UPPER LIMIT OF DETECTION CAPABILITY. THE ION SOURCE SENSITIVITY CAN BE REDUCED UP TO A FACTOR OF 10 ON COMMAND. MOUNTED AT THE SATELLITE PERIFHERY WILL BE A SPHERICAL ANTECHAMBER WITH A KNIFE-EDGED ORIFICE FACING NORMAL TO THE SPIN AXIS. THIS CHAMBER. SEALED UNDER VACUUM BEFORE LAUNCH. WILL BE OPENED TO THE ATMOSPHERE ON COMMAND WHEN THE SPACECRAFT IS IN GRBIT. THE INCOMING ATMOSPHERIC SPECIES WILL UNDERSO COLLISIONS WITH THE CHAMBER WALLS: AND SOME OF THIS THERMALIZED GAS WILL ENTER A SMALL DUAL-FILAMENT ION SOURCE, THAT PRODUCES AN ION BEAM PROPORTIONAL TO THE CHAMBER DENSITY. THE SEAM WILL BE DIRECTED INTO A QUADRUPOLE ANALYZER, THAT TRANSMITS IDNS WITH A MASS-TC-CHARGE RATIO OF 28. TO AN ELECTRON MULTIPLIER WHERE INDIVIDUAL IONS AT THE INPUT WILL BE CONVERTED TO PULSES OF ELECTRONS WHICH WILL BE COUNTED AT THE MULTIPLIER QUIPUT. THESE CUTPUT PULSES WILL BE AMPLIFIED AND SENT TO A DATA PROCESSOR THAT WILL PROVICE DIGITAL OUTPUT SIGNALS. IN THE PROPER FORMAT, TO THE TELEMETRY SYSTEM. THUS, THE DEJECTIVE OF THE MEASUREMENT SYSTEM WILL BE TO PROVIDE A DIGITAL OUTPUT THAT IS PROPORTIONAL TO THE INSTANTANEOUS DENSITY OF NEUTRAL MOLECULAR NITROGEN IN THE SPHERICAL ANTECHAMBER. A TURN-ON SEQUENCE WILL PROVICE THE NECESSARY VOLTAGES TO MEASURE THE CONCENTRATIONS OF SPECIES WITH MASS-TO-CHARGE RATIOS OF 4, 12, 14, 16, 18, 32, 40, AND 44. TOTAL DENSITY MEASUREMENTS CAN ALSO BE OBTAINED. THE INSTANEOUS VALUE OF THE NITRUGEN DENSITY WILL BE SAMPLED A TOTAL OF 44 TIMES FER SPACECRAFT SPIN PERIOD, WITH INCREASED TIME RESOLUTION IN THE REGION OF THE SPIN FOSITION WHERE THE DRIFICE NORMAL IS NEARLY PERPENDICULAR TO THE SATELLITE VELOCITY VECTOR.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG ANALYSIS

NSSDC ID AEROS-B-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PI - M. ROEMER U OF BONN BONN. W. GERMANY

OI - C. WULF-MATHIES U OF BONN BONN. W. GERMANY

### EXPERIMENT BRIEF DESCRIPTION

THE AEROS ATMOSPHERIC DRAG DENSITY EXPERIMENT WILL PROVIDE INDIRECT MEASUREMENTS OF UPPER ATMOSPHERIC DENSITY NEAR SATELLITE FERIGEE. THE EXPERIMENT WILL HAVE NO UNIQUE HARDWARE ON BOARD. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S FOSITION. TO BE LAUNCHED INTO AN FLLIPTIC (APDICE 864 KM. PERIGEE 218 KM) NEAR-FOLAR CRRIT. THE AEROS SATELLITE IS EXPECTED TO YIELD SYSTEMATIC CHANGES IN DENSITY AS A FUNCTION OF ALTITUDE. LATITUDE, AND TIME. THE DATA CETAINED WILL BE CORRELATED WITH DENSITY VALUES SIMULTANECUSLY DERIVED FROM DIRECT PARTICLE DETECTION USING AN ONBOARD NEUTRAL DENSITY GAUGE.

ON 09/00/73. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME - ANS ALTERNATE NAMES - ASTR

ASTRO NETHERLAND SAT

NSSDC ID ANS

PLANNED LAUNCH DATE- 08/00/74

SPACECRAFT WEIGHT IN CREIT-

125. K

LAUNCH SITE- VANCENEERS AFE, UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

THE NETHERLANDS

UNKNOWN

INTERNATIONAL

UNKNOWN

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC APDAPSIS- 550.000 KM ALT DRBIT PERICO- 95. MIN

PERTAPSIS- SEC.COO KM ALT INCLINATION-

98. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - W. SLCEMENCAL

FOKKER VFW N.V.

SCHIPHOLOL-COST

PM - R.K. BROWNING NASA-GSEC

GREENEELT, MD

SPACECRAFT ERIEF DESCRIPTION

THE ASTRONOMICAL NETHERLANDS SATELLITE (ANS) WILL BE AN EARTH-CRBITING SUN-SYNCHRONOUS SATELLITE, CESIGNED FOR USE AS AN ASTRONOMICAL OBSERVATORY. THE SPACECRAFT WILL HAVE A NEAR-CIRCULAR CRBIT AND WILL BE ATTITUDE-CONTROLLED BY MAGNETIC COILS, REACTION WHEELS, AND A YC-YC. ATTITUDE SENSING WILL BE CARRIED OUT BY SOLAR SENSORS, HORIZON SENSORS, AND STAR SENSORS. THO GUIDE STARS NEAR THE DEJECT BEING COSERVED WILL SERVE AS THE FINAL POINTING REFERENCES. EXPERIMENTS ON BOARD WILL OBSERVE CELESTIAL OBJECTS IN UV AND X-RAY WAVELENGTHS.

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- UV TELESCOPE

NSSDC ID ANS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=DTFER INVESTIGATOR)

PI - R.J. VANCUINEN

KAPTEYN OBS

GRENINGEN. THE NETHERLANDS

OI - J. BORGMAN U OF GRONINGEN FOCEN, NETHERLANDS

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT, WHICH WILL REQUIRE A POINTING ACCURACY OF 1 ARC-MIN. WILL CONSIST OF A SMALL CASSEGRAIN TELESCEPE CCUPLED TO A GRATING SPECTROGRAPH. THE SPECTROGRAPH WILL COVER FIVE WAVELENGTH BANCS BETWEEN 1500 AND 3295 A. USING PHOTOMULTIPLIERS AS DETECTORS. THE EXPERIMENT IS DESIGNED TO BE SENSITIVE ENOUGH TO DESERVE STARS UP TO THE 10TH MAGNITUDE.

ON / / . THE SPACECRAFT MISSION WAS

NSSDC ID ANS -02

EXPERIMENT NAME- LOW-ENERGY X-RAY EXPERIMENT

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR) U OF UTRECHT UTRECHT. THE NETHERLANDS CE JAGER

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NYLAR-WINDOW PROPORTIONAL COUNTER (44- TO 55-A PASSBAND), LOCATED AT THE FOCUS OF A GRAZING INCIDENCE RING PARABOLDIC TELESCOPE. AND A TITANIUM-WINDOW PROPORTIONAL COUNTER (FASSBANDS OF 27- TO 35-A, 4- TO 12-A, AND 2- TO 4-A) LOCATED BEHIND A HENEYCOME COLLIMATOR. THE EXPERIMENT. WHICH WILL OBSERVE X RAYS FROM CUSMIC SOURCES. WILL REQUIRE AN INSTRUMENT POINTING ACCURACY OF 0.1 DEG.

/ / , THE SPACECRAFT MISSION WAS ON

NSSCC IC ANS -03 EXPERIMENT NAME- HIGH ANGULAR AND SPECTRAL RESCLUTION DESERVATIONS OF COSMIC X-RAY SOURCES

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) HARVARD COLLEGE OBS CAMERIDGE. MA GURSKY PI - H.

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DESERVE HARD X RAYS FROM COSMIC SOURCES IN THE 2- TO 40-KEV ENERGY REGION. THE INSTRUMENTS WILL CONSIST OF TWO BERYLLIUM-WINECWED PROPORTIONAL COUNTERS AND A TWO-CRYSTAL BRAGG SPECTROMETER MOUNTED OUTSIDE THE CENTRAL SQUARE THEE NEAR THE TOP OF THE SATELLITE. THE FROPORTIONAL COUNTERS WILL EACH HAVE AN APPROXIMATELY 100-CM SQ COLLECTING AREA AND AN ANGULAR RESOLUTION OF PLUS OR MINUS 6 ARC-MIN. THE CRYSTAL SPECTROMETERS WILL FOINT WITH FLUE OR MINLS 1 ARC-MIN ANGULAR RESELUTION. THE DETECTION LIMITS FOR THE PROPORTIONAL COUNTERS WILL BE ABOUT 3 X 10 TO THE MINUS THREE PHOTONS/SQ-CM-SEC (OR ACOUT 3 X 10 TO THE MINUS FIVE TIMES THE GESERVED FLUX OF SCORPIUS X-1). THE BRAGG SPECTROMETER WILL DETECT IRON EMISSIONS OF GREATER THAN 1 PERCENT IRON IN A SOURCE 0.01 OF SCORPIUS X-1.

/ / . THE SPACECRAFT MISSICN WAS ON

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SPACECRAFT COMMON NAME - ASTP APDLO-SOYUZ TEST PROJECT ALTERNATE NAMES -

NEEDC ID ASTP

SPACECRAFT WEIGHT IN ORBIT-PLANNED LAUNCH CATE- 07/15/75

KG

LAUNCH SITE-

LAUNCH VEHICLE-

FUNDING AGENCY UNITED STATES U.S.S.K.

NASA-UA UNKNOWN

PLANNED DRUIT PARAMETERS ORBIT TYPE- GEOCENTRIC

ORBIT PERICD+

MIN

APUAPSIS- 230. KM ALT PERIAPSIS- 230. KM ALT INCLINATION-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=PROJECT SCIENTIST)

PM = L. CASEY NASA HEADQUARTERS WASHINGTON, DC

PS - BUSTEYEV

UNKNOWN USSR

SPACECRAFT BRIEF DESCRIPTION

THE APOLLE-SOYUZ TEST PROJECT (ASTP) WILL BE THE FIRST INTERNATIONAL MANNED SPACE FLICHT. IT WILL TEST A DOCKING AND RENDEZVOUS SYSTEM CONTRIBUTING TO DEVELOPMENT OF INTERNATIONAL SPACE RESCUE CAPABILITY AND FUTURE COOPERATION IN MANNED SPACE MISSIONS. THE SPACECRAFT WILL CARRY FOUR ASTRONOMY AND SPACE PHYSICS EXPERIMENTS. FIVE LIFE SCIENCES EXPERIMENTS. AND EIGHT SPACE APPLICATIONS EXPERIMENTS.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EXTREME ULTRAVIOLET ASTRONOMY

NESCC ID ASTP -01

DEG

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - C.S. BOWYER U OF CALIFORNIA, BERK BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFCAMED TO SEARCH FOR SOURCES OF EXTREME ULTRAVIOLET RADIATION (EUV) IN THE NIGHT SKY. THE PRINCIPAL INSTRUMENT WILL BE A FLUX-COLLECTING GRAZING-INCIDENCE TELESCOPE WITH AN EUV DETECTOR AT ITS FOCAL POINT, NOUNTED OUTSIDE THE SFACECRAFT.

ON 09/06/73, THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- HELIUM GLOW

NESDC ID ASTF -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CI=CTHER INVESTIGATOR)
PI = C.S. BOWYER U OF CALIFORNIA, BERK EERKELEY. CA

EXPERIMENT BRIEF DESCRIPTION

THIS ASTE EXPERIMENT WILL BE PERFORMED TO MEASURE THE INTENSITY AND SPATIAL DISTRIBUTION OF HELIUM-FLUORESCENT RADIATION IN SELECTED REGIONS OF THE NIGHT SKY. THE MEASUREMENTS COULD GIVE THE DISTRIBUTION OF HELIUM INTERPLANETARY SPACE, AND INDICATE THE PENETRATION OF INTERSTELLAR HELIUM INTO THE SOLAR SYSTEM. MEASUREMENTS WILL BE MADE WITH A NARROW-PASSBAND PHOTOMETER, SENSITIVE TO FELIUM RADIATION AND POINTED TO AN ACCURACY OF 4 DEG.

UN 09/06/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET ATMOSPHERIC ABSCRPTICA

NSSEC ID ASTF -03

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, DIECTHER INVESTIGATOR)
PI - T.M. DONAFUE U OF PITTSBURGH PITTSBURGH, PA

# EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO MEASURE THE CONCENTRATION OF ATMUSPHERIC CONSTITUENTS. ESPECIALLY ATOMIC CXYGEN AND NITROGEN. IN THE ATMOSPHERE BY ULTRAVIULET ABSCRITTEN AND RESENANCE-SCATTERING SPECTROSCOPY. UTILIZING THE SPACE BETWEEN THE TWO SPACECRAFT. ULTRAVIOLET LIGHT FROM RESONANCE LINE SCURCES WILL BE SENT BY A TELESCOPE MOUNTED ON THE APOLLO TO AN ARRAY OF CORNER (UEES ON THE SOYUZ AND RETURNED TO A SCANNING SPECTRUMETER/DETECTOR ON THE APOLLO. THE EXPERIMENT WILL INTRODUCE A NEW TECHNIQUE FOR MEASURING ATMOSPHERIC CONSTITUENTS. THE DISTANCE BETWEEN THE TWO SPACECRAFT WILL BE VARIED TO ELIMINATE ABSORPTION EFFECTS OF CUNTAMINANTS ARCUND EITHER SPACECRAFT.

EN 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - SKY-EARTH X-RAY CBSERVATIONS . NESCO IC ASTP

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) NAVAL RESEARCH LAB WASHINGTON. DC

### EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFCRAED TO PRODUCE A CETAILED MAP OF CELESTIAL SOFT X-RAY EMISSIONS IN THE 0.1- TO 1.0-KEV FANGE. ROCKET OBSERVATIONS HAVE DETECTED A DIFFUSE BACKGROUND OF SOFT X-RAY RADIATION. BUT A SYSTEMATIC SKY SURVEY HAS NEVER BEEN MADE IN THE 0.1- TO 1.0-KEY ENERGY RANGE. SATELLITE OBSERVATIONS WILL PROVIDE FINER ANGULAR RESULUTION AND STATISTICS NEEDED TO CETERMINE THE VARIOUS SOURCES THAT CONTRIBUTE. THE THIN-WINDOW, SOFT X-RAY DETECTOR WILL SE MOUNTED IN A EAY OF THE AFOLLO SERVICE MODULE.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

NSSDC ID ASTP -05 EXPERIMENT NAME- SURFACE TENSION INDUCED CONVECTION IN EMCAPSULATED LIQUID METALS IN ZERO G

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) OAK RIDGE NATE LAB CAK RICCE. TN REED PI - R.É. CAK FICCE. TN OAK RIDGE NATE LAB BRUNI 01 - F.J.

#### EXPERIMENT BRIEF DESCRIPTION

PAIRED SPECIMENS OF ALLCYS CONTAINING SMALL AMOUNTS OF GOLD WILL BE MELTED IN IPON AND GRAPHITE CAPSULES AND ALLOWED TO MIX. AFTER THE METALS HAVE SOLIDIFIED AND BEEN RETURNED TO EARTH, THEY WILL BE OUT INTO THIN SLICES AND THE SECTIONS ANALYZED FOR DISTRIBUTION OF GOLD TO DETERMINE THE PRESENCE OR ABSENCE OF CONVECTIVE EFFECTS CAUSED BY VARIATIONS IN SURFACE TENSION DURING THE FEATING.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

NESEC ID ASTF -06 EXPERIMENT NAME- INFLUENCE OF WEIGHTLESSNESS Ch THE IMMISCIBILITY OF MONOTECTIC ALLOY SYSTEMS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 01=0THER INVESTIGATOR)

PI - C.Y. ANG

NORTHROP CORP LAB

HANTHORNE, CA

EXPERIMENT BRIEF DESCRIPTION

SPECIMENS OF TWO DIFFERENT ALLOYS WILL BE MELTED AND SAMPLES WITHDRAWN AFTER VARYING PERIODS TO ASSESS HOW THE LACK OF STRATIFICATION IN WEIGHTLESS MIXTURES OF LIQUIDS OF DIFFERING DENSITIES MAY INFLUENCE THE APPROACH TO EQUILIBRIUM IN THE FORMATION OF INTERMETABLLIC COMPOUNDS.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - ROLE OF CONVECTION IN SOLIDIFICATION NSSCC 10 ASTP -07 - FROCESS IN FIGH COERCIVE STRAIGHT MAGNET

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D. LARSON GRUMMAN AERCSFACE BETHPAGE, NY
UI - T.Z. KATTAMIS U OF CONNECTICUT STORES, CT

EXPERIMENT ERIEF DESCRIPTION

MAGNETIC MATERIALS WILL BE NELTED AND RESOLIDIFIED AT CONTROLLED RATES TO SEL WHETHER CAST MATERIALS WITH IMPROVED PROPERTIES CAN BE MADE UNDER WEIGHTLESS CONDITIONS.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DETERMINATION OF ZERO-GRAVITY EFFECTS ON NSSDC 1D ASTP -08
ELECTRONIC MATERIALS PROCESSING

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR) DIEDTHER INVESTIGATOR)
PI - H.C. GATOS MIT CAMERIDGE. WA
DI - A.F. WITT MIT CAMBRIDGE. WA

EXPERIMENT BRIEF DESCRIPTION

A CYLINDRICAL CRYSTAL OF DOPED GERMANIUM WILL BE PARTLY MELTED AND THEN RESCLIDIFIFG. CURING SCLIDIFICATION. ARTIFICIAL GROWTH BANDS WILL BE INTRODUCED INTO THE CRYSTAL BY ELECTRICAL PULSES AT 5-SEC INTERVALS. AND WILL PRODUCE HEATING AT THE SCHID/LIQUID INTERFACE. THE BANDS WILL PROVIDE A TIME REFERENCE FOR DETERMINATION OF MICROSCOPIC GREWTH RATES. THIS INFORMATION, AND MEASUREMENTS OF THE DISTRIBUTION OF MATERIAL WITHIN THE CRYSTAL, WILL MAKE POSSIBLE CETAILED ANALYSIS OF THE GROWTH PROCESS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - CRYSTAL GREATH FROM THE VAFOR PHASE IN NSSCC IC ASTP -09.
ZERO-GRAVITY ENVIRONMENT

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)
PI - H. WIEDEMEIER RENSSALAER FOLY INST ROCHESTER, NY

EXPERIMENT BRIEF DESCRIPTION

THREE EXPERIMENTS WILL BE PERFORMED ON THE GROWTH OF SEMICONDUCTOR CRYSTALS IN THE FURNACE, USING DIFFERENT MATERIALS, TO SEE HOW THE GROWTH PROCESS IN WEIGHTLESSNESS DIFFERS FROM CRYSTAL GROWTH ON EARTH.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ZERO-GRAVITY SOLIDIFICATION OF NACL-LIF NESCO IC ASTP -10
EUTECTIC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTHER INVESTIGATOR)

PI - A.S. YUE U OF CALIFCRNIA, LA LCS ANGELES: CA

OI - C.W. YEH U OF CALIFCRNIA, LA LCS ANGELES: CA

## EXPERIMENT BRIEF DESCRIPTION

SAMPLES OF A SOCIUM-CHLORIDE AND LITHIUM-FLUCRIDE COMPOSITION WITH A LOW MELTING POINT WILL BE MELTED IN THE FURNACE AND THEN SOLIDIFIED. THIS MATERIAL SOLICIFIES IN THE FORM OF FIBERS OF LITHIUM-FLUCRIDE EMBEDDED IN SOCIUM-CHLORIDE THAT CAN ACT AS AN IMAGE-TRANSMITTING MEDIUM FOR INFRARED LIGHT. THE EXPERIMENT WILL ATTEMPT TO PRODUCE SAMPLES WITH A FIBER DISTRIBUTION SHOWING A HIGH DEGREE OF CRIENTATION, REGULARITY, AND FIBER CONTINUITY.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROPHORESIS

NEEDC ID ASTF -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. QI=CTHER INVESTIGATOR)
PI - K. HANNING MAX PLANCK INST WEST GERMANY

# EXPERIMENT BRIEF DESCRIPTION

THIS PURPOSE OF THIS EXPERIMENT WILL BE TO ANALYZE, PURIFY, AND ISOLATE SAMPLES FOR MEDICAL AND BIOLOGICAL RESEARCH. IT MAY CONTRIBUTE TOWARD DEVELOPMENT OF SEPARATION METHODS FOR PRODUCING VACCINES AND SERUMS IN SPACE FOR MEDICAL USE ON EARTH. HUMAN AND RABBIT ELCOD CELLS WILL BE INTRODUCED CONTINUOUSLY INTO A EUFFER FLUID WHICH WILL FLOW THROUGH AN ELECTRICAL FIELD. THE CELLS WILL BE SEPARATED INTO THEIR CONSTITUENTS AT VARIOUS ANGLES AS THEY MIGRATE THROUGH THE BUFFER FLUID. THE SEFARATED CONSTITUENTS OF THE CELLS CAN BE ANALYZED AND COLLECTED. THE ZERO-G SPACE ENVIRONMENT WILL ALLOW HIGHER FLOW RATE AND BETTER YIELD OF SEPARATION THAN CAN BE ACHIEVED IN EARTH'S GRAVITY. FACTORS LIKE HEAT CONVECTION.

ON 09/06/73, THE SPACECRAFT WISSICH WAS APPROVED.

EXPERIMENT NAME- SPACECRAFT-TO-SPACECRAFT DCFFLER NSSCC ID ASTF -12
TRACKING

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - G.C. WEIFFENEACH SAD CAMBRIDGE, MA

#### EXPERIMENT BRIEF CESCRIPTION

THE APOLLE-SOYUZ VHF RANGING SYSTEM WILL BE USED TO MEASURE CHANGES IN THE DISTANCE BETWEEN THE TWO SPACECRAFT AS INDICATIONS OF LOCAL ANOMALIES OF EARTH'S GRAVITY FIELD. THE STRUCTURE OF THE EARTH'S GRAVITY FIELD IS OF SCIENTIFIC INTEREST BECAUSE IT IS ONE OF THE CLUES TO INTERNAL DISTRIBUTION OF THE EARTH'S MASS. DATA ON GRAVITY ANOMALIES WILL CONTRIBUTE TO GEOLOGICAL AND GEOPHYSICAL STUDIES OF CONTINENTAL DRIFT, EARTHGLAKES. VOLCANIC

ACTIVITY, AND MINERAL RESOURCES.

ON 09/06/73. THE SFACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- POLYMORPHONUCLEAR LEUKOCYTE RESPONSE TO INSSIGN ASTR -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - R.R. MARTIN BAYLOR U HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY POSSIBLE EFFECTS OF WEIGHTLESSNESS ON THE FUNCTION OF POLYMORPHONUCLEAR LEUKCOYTES. ELGOD SAMPLES WILL BE TAKEN FROM THE ASTRONAUTS BEFORE AND AFTER THE MISSION AND COMPARATIVE STUDIES WILL BE MADE OF WHITE CELL RESPONSE TO BACTERIA. THE DATA WILL PROVIDE ACDITIONAL INFORMATION ON THE POSSIBLE EFFECTS OF A LONG-DURATION SPACE MISSION ON RESISTANCE TO BACTERIAL INFECTIONS.

ON 09/06/73, THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- EFFECTS OF SPACE FLIGHT ON THE CELLULAR NSSCC IC ASTF -14
RESPONSE OF MAN

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTFER INVESTIGATOR)
PI - 8.5. CRISWELL BAYLOR U HOLSTON: TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY THE EFFECTS OF SPACE FLIGHT ON THE RESPONSE OF LYMPHOCYTE CELLS TO INFECTIOUS AGENTS. STUDIES WILL BE MADE FROM LYMPHOCYTES IN BLOOD SAMPLES TAKEN FROM THE ASTRONAUTS BEFORE AND AFTER THE MISSION. THE DATA CAN BE COORDINATED WITH THAT OBTAINED ON THE POLYMORPHONUCLEAR LEUKOCYTE CELL EXPERIMENT.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME+ MICROBIAL EXCHANGE TEST

NESDC ID ASTF -15

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - G.R. TAYLOR NASA-JSC HOUSTON, TX

EXPERIMENT ERIEF CESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO QUANTITATIVELY MONITOR THE MICROBIAL LOAD OF CREWMEN AND THE DEGREE OF MICROBIAL EXCHANGE BETWEEN CREWMEN. MICROBIOLOGICAL SAMPLES WILL BE COLLECTED WITH SWAES FROM THE ASTRONAUTS AND COSMONAUTS AND FROM THE INTERIOR OF THE APOLLO AND SOYUZ SPACECRAFT AT SPECIFIED TIMES BEFORE. DURING. AND AFTER THE FLIGHT. INFLIGHT SAMPLES WILL BE COLLECTED BY THE CREWMEN WHILE THE TWO SPACECRAFT ARE DOCKED. COMPARISONS BETWEEN SAMPLE PERIODS. INDIVIDUALS. AND COLLECTION SITES WILL ESTABLISH MICROBIAL EXCHANGE PATTERNS.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) FRANKFURT. WEST GERMANY U OF FRANKFURT PI - H. BUCKER

## EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT WILL PROVIDE DATA ON THE EFFECTS COSMIC RAYS AND CTHER SPACE FLIGHT RACIATION MAY HAVE ON DEVELOPMENT OF SELECTED BIOLOGICAL MATERIALS . SIMILAR EXPERIMENTS WERE FLOWN ABOARD THE APOLLO 15 AND 17 SPACECRAFT. LAYERS OF BACILLUS SUBTILIS SFORES (EACTERIA SFORES). COLPODA CUCULLUS CYSTS (PROTOZOA CYSTS), ARABIDCPSIS THALIANA SEEDS (WATERCRESS SEED), VICIA FARA RADICULEA (BEAN ROOTS), ARTEMIA SALINA EGGS (BRINE SHRIMP), AND THIEDLUM CASTENEUM EGGS (BEETLE EGGS) WILL EE STACKED ALTERNATELY WITH LAYERS OF DIFFERENT TRACK DETECTORS (NUCLEAR EMULSIONS. PLASTICS, AND SILVER CHLORIDE CRYSTALS). THE STACK WILL BE SEALED IN A SMALL CONTAINER AND PLACED ABOARD THE APOLLO SPACECRAFT. AFTER RECOVERY. A COMPARISON WILL BE MADE OF THE DEVELOPMENT OF THE BIOLOGICAL SAMPLES WITH BALLOGN AND GROUND-EASED TRRADIATION EXPERIMENTS. ANY MUTATION OR OTHER DEVELOPMENT ANOMALIES WILL BE OF PARTICULAR INTEREST. DATA WILL CONTRIBUTE TOWARD ESTIMATING RADIATION HAZARDS DURING SPACE FLIGHT.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LIGHT FLASHES AND OTHER SENSATIONS FROM INSSECTION ASTE -17 COSMIC PARTICLES

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) LAWRENCE LIVERMORE LAB LIVERMORE. CA TOBLAS PI - C. A. L OF CALIFORNIA, BERK BERKELEY, CA BUD INCER OI - T.F.

### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO ASCERTAIN THE FREQUENCIES AT WHICH CUSMIC RAYS CAN BE DETECTED BY FLIGHT CREWS IN EARTH DRBIT. AND THE LATITUDES AT WHICH THE PHENOMENON OCCURS. DURING AFCULC MISSIONS, ASTRONAUTS REPORTED SEEING ERIGHT FLASHES AND STREAKS OF LIGHT DURING TOTAL DARKNESS. THE FLASHES ARE THOUGHT TO BE HEAVY PARTICLES FROM GALACTIC COSMIC RAYS INTERACTING WITH TISSUE IN OR NEAR THE RETINA OF THE EYE. HOWEVER. OBSERVATIONS BY THE APOLLO CREWS WERE NOT CONSISTENT AS TO THE FREQUENCY THE PHENOMENON OCCURRED. WHILE CARRYING OUT THE EXPERIMENT ON THE ASTP MISSION, CREWMEN WILL DON A SPECIALLY-FITTED FULL HEAD MASK WHICH WILL BE SOUNDPROOF AND LIGHTPROOF. THE MASK WILL BE WORN FOR PERIODS OF ONE TO TWO HOURS WHILE REPORTING LIGHT FLASH PHENOMENA OR SENSATIONS OF SOUND. TASTE. AND SMELL WHICH MIGHT BE CONSIDERED UNUSUAL IN CONNECTION WITH THESE LIGHT FLASHES. COSMIC PARTICLE DETECTORS, LIGHT-EMITTING DIODES, AND A SPEAKER SYSTEM FOR COMMUNICATION PURPOSES WILL BE BUILT INTO THE MASK. DATA WILL CONTRIBUTE TO LABORATORY STUDIES FOR DETECTION OF COSMIC RAYS AND ESTIMATING RADIATION HAZAROS DURING SPACE FLIGHT.

ON 09/06/73. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- ASTP-APOLLO ALTERNATE NAMES-

NSSDC ID ASTP-A

PLANNED LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT IN CREIT-

KG

LAUNCH SITE- CAPE KENNEDY, LNITED STATES

LAUNCH VEHICLE- SATURN 18

FUNDING AGENCY UNITED STATES

NASA-CMSF

PLANNED GROIT PARAMETERS

URBIT TYPE- GEOCENTRIC

ORBIT PERICC- '

MIN

DEG

APOAPSIS -230. KM ALT PER IAPS IS- 230 - KM ALT

NASA HEADQUARTERS WASHINGTON, DC

INCLINATION-

SPACECRAFT PERSUNNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST) PM -LEE

SPACECRAFT BRIEF DESCRIPTION

THE UNITED STATES AND THE U.S.S.R. WILL LAUNCH AN AFCLLO SPACECRAFT (ASTP-A) AND A SOYUZ SPACECRAFT (ASTP-S). RESPECTIVELY, AS A JOINT EFFORT CALLED THE APOLLO-SOYUZ TEST PROJECT (ASTP). THE SOYUZ SPACECRAFT WILL BE LAUNCHED FIRST. WITH A TWO-MAN CREW WHO WILL MANEUVER THEIR SPACECRAFT INTO A DECKING ORBIT. THE APOLLO SPACECRAFT WILL BE LAUNCHED 7 1/2 HR LATER, WITH A THREE-MAN CREW WHO WILL PLACE THEIR SPACECRAFT INTO A PROPER CONFIGURATION FOR DOCKING WITH THE SOYUZ SPACECRAFT. THE DECKING OF THE TWO SFACECRAFT IS TO OCCUR ABOUT TWO DAYS INTO THE MISSION. AFTER DECKING. CREM TRANSFERS WILL TAKE PLACE, WITH THE APOLLO CREW FIRST VISITING THE SOYUZ. THE COMBINED APOLLO-SOYUZ CREWS WILL PERFORM JOINT EXPERIMENTS AND FRESENT RADIC AND TV REPORTS. AFTER THE JOINT EXPERIMENTS HAVE BEEN COMPLETED. THE SPACECRAFT WILL DISENGAGE AND EACH WILL CONTINUE ITS SEPARATE MISSION.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

SPACECRAFT COMMON NAME- ASTP-SOYUZ ALTERNATE NAMES-

NSSDC ID ASTP-S

PLANNED LAUNCH CATE- 07/15/75

SPACECRAFT WEIGHT IN CREIT-

KG

LAUNCH SITE- TYURATAM-BAIKENUR. U.S.S.R.

LAUNCH VEHICLE-

FUNDING AGENCY

U.S.S.R.

UNKNOWN

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC APD APS IS -

ORBIT PERICC-230 KM ALT PERIAPSIS- 230 KM ALT INCLINATION-

MIN

DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT ERIEF DESCRIPTION

THE UNITED STATES AND THE U.S.S.R. WILL LAUNCH AN APOLLO SPACECRAFT (ASTP-A) AND A SOYUZ SPACECRAFT (ASTP-S), RESPECTIVELY, AS A JCINT EFFORT

CALLED THE APPLLC-SOYUZ TEST PROJECT (ASTF). THE SCYUZ SPACECRAFT WILL BE LAUNCHED FIRST, WITH A TWO-MAN CREW WHO WILL MANELVER THEIR SPACECRAFT INTO A DECKING DREIT. THE APELLE SPACECRAFT WILL BE LAUNCHEE 7 1/2 HR LATER, WITH A THREE-MAN CREW WHO WILL PLACE THEIR SPACECRAFT INTO A PROPER CONFIGURATION FOR DOCKING WITH THE SOYUZ SPACECRAFT. THE DOCKING OF THE TWO SPACECRAFT IS TO OCCUR ABOUT TWO DAYS INTO THE MISSICN. AFTER DECKING, CREW TRANSFERS WILL TAKE PLACE, WITH THE APOLLO CREW FIRST VISITING THE SCYUZ. THE COMBINED APOLLO-SOYUZ CREWS WILL PERFORM JOINT EXFERIMENTS AND PRESENT RADIC AND TV REPORTS. AFTER THE JOINT EXPERIMENTS HAVE BEEN COMPLETED. THE SPACECRAFT WILL DISENGAGE AND EACH WILL CONTINUE ITS SEPARATE MISSION.

ON 09/05/73. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- ATS-F PL-721A ALTERNATE NAMES-

NSSDC ID ATS-F

PLANNED LAUNCH DATE- 04/00/74 SPACECRAFT WEIGHT IN CREIT-

930 . KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY UNITED STATES

NASA-CA

PLANNED ORBIT PARAMETERS

ORBIT PERICE- 144C. MIN GRBIT TYPE- GECCENTRIC

APDAPSIS- 35700 . KM ALT PERIAPSIS- 35700 . KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSUNNEL (PM=PRCJECT MANAGER, PS=PRCJECT SCIENTIST)

PM - J. M. THOLE

NASA-GSFC

GREENBELT. MD

ROCHELLE PS - R.W.

NASA-GSEC

GREENEELT. MD

SPACECRAFT ERIEF CESCRIFTICK

THE PRIMARY DEJECTIVES OF ATS-F (APPLICATIONS TECHNOLOGY SATELLITE) WILL BE TO ERECT IN ORBIT A LARGE HIGH-GAIN STEERABLE ANTENNA STRUCTURE CAPABLE OF PROVICING A GOOD QUALITY IV SIGNAL TO A GROUND-PASED RECEIVER AND TO MEASURE AND EVALUATE THE PERFORMANCE OF SUCH AN ANTENNA. A SECONDARY DBJECTIVE WILL BE TO DEMONSTRATE NEW CONCEPTS IN SPACE TECHNOLOGY IN THE AREAS OF AIRCRAFT CONTROL, LASER COMMUNICATIONS, AND VISUAL AND INFRARED MAPPING OF THE EARTH/ATMOSPHERE SYSTEM. THE SPACECRAFT WILL ALSO BE CAPABLE UF (1) MEASURING RADIO FREQUENCY INTERFFRENCE IN SHARED FREQUENCY BANDS AND PROPAGATION CHARACTERISTICS OF MILLIMETER WAVES. (2) PERFCENING SPACECRAFT-TC-SFACECRAFT COMMUNICATION AND TRACKING EXPERIMENTS, AND (3) MAKING PARTICLE AND RADIATION MEASUPEMENTS OF THE GEOSYNCHRONOUS ENVIRONMENT. CONFIGURED SOMEWHAT LIKE AN OPEN PARASCO. THE ATS-F SPACECRAFT WILL CONSIST OF FOUR MAJOR ASSEMBLIES -- (1) A 9-15-M-DIAM DISH ANTENNA. (2) TWC SOLAR CELL FADDLES MOUNTED AT RIGHT ANGLES TO EACH OTHER ON OPPOSITE SIDES OF AN UPPER EQUIPMENT MODULE. (3) AN EARTH-VIEWING EQUIPMENT MODULE (EVM) CONNECTED BY A TUBULAR MAST TO THE UPPER EQUIPMENT MODULE, AND (4) AN ATTITUDE CONTROL AND STABILIZATION SYSTEM. THE EVM. IN ADDITION TO HOUSING THE EARTH-VIEWING EXPERIMENTS. WILL PROVICE SUPPORT FOR THE PROPULSION SYSTEM AND TANKS. BATTERIES. A MULTIFREQUENCY TRANSPONDER. AND THE TELEMETRY, COMMAND, AND THERMAL CONTROL SYSTEMS. THE UPPER EQUIPMENT MODULE WILL PROVIDE A PLATFORM FOR THE SPACE-VIEWING EXPERIMENTS. INERTIA WHEELS WILL BE THE PRINE MEANS FOR TORQUING THE SPACECRAFT. WITH BOTH HYDRAZINE AND AMMONIA MULTIJET THRUSTER SYSTEMS INCLUDED TO PROVIDE THE NECESSARY TORQUES FOR UNLOADING THE WHEELS.

UN 12/18/72, THE SPACECRAFT MISSICN WAS APERCVED.

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY FROTONS

NSSCC IC ATS-F -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CI=CTER INVESTIGATOR) PI - A. KUNRADI NASA-JSC HOUSTON. TX DI - T.A. FRITZ NOAA BOULDER, CO

01 - D.J. WILLIAMS NOAA-ERL

BCLLDER, CO

EXPERIMENT ERIEF CESCRIFTICK

SULID-STATE DETECTORS WILL MEASURE THE DIRECTIONAL FLUXES OF PROTONS IN THE RANGE OF 20+ TO 300-KEV IN SIX ENERGY STEPS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- MAGNETEMETER EXPERIMENT

ASSCC ID ATS-F -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) COLEMAN. JR. U OF CALIFCRNIA, LA LCS ANGELES, CA DI - W.D. CUMMINES GRAMBLING COLLEGE GRANBLING. LA

EXPERIMENT ERIEF CESCRIFTION

THE MAGNETIC FIELD WILL BE MEASURED USING THREE CRITICGENAL FLUXGATE SENSORS. THE ACCURACY WILL BE 1/8 GAMMA WITH A RANGE OF 1024 GAMMA. THE TELEMETRY PATE WILL BE 450 EPS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY PROTON/ELECTRON EXPERIMENT NSSCC IC ATS-F -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) Fi - R.L. ARNOLDY L OF NEW HAMPSHIRE CURHAN, NE

EXPERIMENT ERIEF DESCRIPTION

A CHANNELTRON PRECEDED BY AN ELECTROSTATIC ANALYZER WILL BE USED TO MEASURE ELECTRONS FROM 2 TO 25 KEV IN 11 DIFFERENTIAL ENERGY WINDOWS AND PROTONS FROM 20, TO 500 KEV AT TWO DIFFERENTIAL FLICH ANGLES.

ON 12/18/72. THE SPACECRAFT MISSICH WAS APPREVED.

EXPERIMENT NAME - PARTICLE ACCELERATION MECHANISMS AND NEEDC ID ATS-F DYNAMICS OF THE OUTER TRAPPING REGION

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR, OF=OTHER INVESTIGATOR) PI - J.R. WINCKLER U OF MINNESCTA MINNEAPOLIS. MN

SEATTLE. WA L OF MASHINGTON

PARKS 01 - G.K.

EXPERIMENT ERIEF CESCRIFTION

THIS EXPERIMENT WILL INVESTIGATE THE ORIGIN OF THE VAN ALLEN TRAPPED RADIATION. IT WILL CONSIST OF A MAGNETIC DEFLECTION SEPARATION SYSTEM AND A SULID-STATE PARTICLE COUNTER SYSTEM. THE PARTICLE COUNTERS WILL HAVE DIRECTIONAL CAPABILITIES SO THAT PARTICLE PLICH ANGLES MAY BE DETERMINED. THE SYSTEM WILL RESPOND TO PROTONS IN THE RANGES 20 TO 50 KEV. 50 TO 150 KEV. AND 150 TO 500 KEV. AND TO ELECTRENS IN THE FANGES 20 TO 40 KEV. 100 TO 200 KEV. AND 1.0 TO 1.5 MEV.

ON 12/13/72, THE SPACECRAFT MISSIUN WAS APPROVED.

EXPERIMENT NAME- AUBURAL PARTICLES EXPERIMENT

NESDO ID ATS-F -05

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR: CIECTFER INVESTIGATOR) U DE CALIFCRNIA. SD SAN DIEGO, CA MCILWAIN PI - C.L. U CF CALIFCRNIA, SE SAN DIEGO. CA FILLIUS 01 - R.W.

EXPERIMENT BRIEF DESCRIPTION

A QUALRISPHERICAL ELECTROSTATIC ANALYZER AND ASSOCIATED CHANNELTRON WILL MEASURE ELECTRONS AND PROTONS FROM THER MAL ENERGIES TO 70 KEV IN 62 DVERLAPPING STEPS OVER A RANGE OF DIFFERENT PITCH ANGLES.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

NSSCC IC ATS-F -06 EXPERIMENT NAME- SOLAR CLEMIC RAYS AND GERMAGNETICALLY TRAPPLE RACIATION

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHEF INVESTIGATOR) HUNTINGTON BEACH. CA MCDONNELL-CELGLAS PI - A.J. MASLEY HUNTINGTON EEACH. CA MICEO NNELL-DELGLAS 01 - P.R. SATTERBLEM

EXPERIMENT ERIEF DESCRIPTION

TWO SULID-STATE TELESCOPES. ONE DIRECTED PERPENDICULAR TO AND THE OTHER DIRECTED PARALLEL TO THE LOCAL MAGNETIC FIELD DIRECTION, WILL EACH MEASURE PROTONS FRUN C.R TU BCC MEV IN 12 ENERGY INTERVALS AND ALPHA PARTICLES FROM 1 .2 TO 180 MEY IN 10 ENERGY INTERVALS. TWO MAGNETIC ELECTRON SPECTROMETERS, CRIENTED PARALLEL TO THE TWO TELESCOPES, WILL MEASURE ELECTRONS FROM SC TT 800 KEV IN FOUR ENERGY INTERVALS.

CN 12/18/72. THE SPACECRAFT MISSICH WAS APPRICATED.

EXPERIMENT NAME- OMNIDIRECTIONAL SPECTROMETER

NSSDC 10 ATS-F -07

EXPERIMENT PERSONNEL (FIERRINGIPAL INVESTIGATOR) EL SEGUNDU. CA AERGSPACE CITER . BLAKE PI - b. EL SEGUNDO + CA AEROSPACE CORP 01 - J.B. PAULIKAS

EXPERIMENT BRIEF DESCRIPTION THE PURPOSE OF THIS EXPERIMENT WILL BE TO MEASURE THE CHNIDIRECTIONAL FLUXES AND SPECTRA OF ELECTRONS AND PROTONS. FOUR DETECTORS WILL COUNT

PROTONS FROM 2 CR 3 TO 10 MEV. 10 TO 21 MEV. 20 TO 40 MEV. AND 40 TO 80 MEV. THEY WILL ALSO COUNT, RESPECTIVELY, ELECTRONS OF ENERGIES GREATER THAN 80 KEV AND 250 KEV. 100 KEV. 1.2 MEV. AND 4 MEV.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CEDSYNCHRONOUS VERY HIGH RESOLUTION RACIOMETER (GVHRR)

NSSOC ID ATS-F -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=OTHER INVESTIGATOR)

PI - W. SHENK

MASA-GSFC NASA-GSFC

GREENBELT. MD

GI - A.W. MCCULLOCH DI - I.L. GOLDEERG

NASA-GSEC

GREENBELT. MO

### EXPERIMENT ERIEF DESCRIPTION

THE GEOSYNCHRONOUS VERY HIGH RESCLUTION RADIONETER (GWARR) EXPERIMENT WILL PROVIDE BOTH DAY AND NIGHT CLOUDCOVER INFORMATION FOR DETERMINING CLOUD MCTIONS. TROPICAL AND EXTRATROPICAL STORM LIFE CYCLES. AND MESCSCALE PHENOMENA. THEY WILL ALSO BE USED FOR FOR CLOUD CLIMATCLOGY STUDIES. THE GVHRR WILL HAVE ONE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND ONE VISIBLE CHANNEL (0.55 TO 0.75 MICRON). THE INSTANTANEOUS FIELD OF VIEW WILL BE 0.3 MILLIRADIAN FOR THE INFRARED CHANNEL (IC.6+KM RESCLUTION AT SUBSATELLITE POINT) AND 0.15 MILLIRADIANS FOR THE VISIBLE CHANNEL (5.6+KM RESOLUTION AT SUBSATELLITE POINT). THE DYNAMIC RANGE FOR THE INFRARED CHANNEL WILL BE FROM U TO 340 DEG K AND 1 TO 100 PERCENT ALBEDO FOR THE VISIBLE CHANNEL. THE INFRARED CHANNEL WILL HAVE A NOISE EQUIVALENT TEMPERATURE DIFFERENCE OF 1.5 DEG C AT 200 DEG K AND C.5 CEG C AT 300 DEG K DATA FROM THIS EXPERIMENT WILL BE USED TO DETERMINE SURFACE TEMPERATURES AND HORIZONTAL WIND VECTORS BASED ON CLOUD MOTIONS DERIVED FROM SEQUENTIAL IMAGES FORMED BY BOTH CHANNELS OF THE CYPER.

ON 12/13/72. THE SPACECRAFT MISSICH WAS APPREVED.

EXPERIMENT NAME- PADIO BEACON

NSSDC ID ATS-F -09

EXPERIMENT PERSONNEL (FIEPPINCIPAL INVESTIGATOR) DIEOTHER INVESTIGATOR)

PI - K. DAVIES

NUAA

BOULDER. CO

OI - R.E. FRITZ
OI - E.R. SCHIFFMACHER

NOAA-ERL NOAA-ERL BULLDER . CG

DI - R.N. GRUBB

NUAA TERL

BOULDER: CO

#### EXPERIMENT BRIEF DESCRIPTION

A HADIO TRANSMITTER WILL RADIATE PLANE-POLARIZED, PHASE-RELATED TRANSMISSIONS NEAR 40, 41, 120, AND 300 MHZ. CONDITIONS BETWEEN THE SATELLITE AND A CHOUNG-EASED PECEIVER THAT CAN BE CESERVED WILL BE TOTAL ELECTRON CONTENT ALONG THE TRANSMISSION PATH, IONOSPHERIC IRREGULARITIES, IONSPHERIC SCINTILLATIONS, AND IONOSPHERIC ABSCRETION. DATA ON THESE CONDITIONS MAY BE DERIVED BY ANALYSIS OF THE CHANGES IN SIGNAL CHARACTERISTICS (POLARIZATION ROTATION, PHASE CHANGE, SIGNAL STRENGTH LOSS, ETC.) BETWEEN THE TRANSMITTER AND THE RECEIVER. THE PURFOSE OF THIS EXPERIMENT WILL BE TO STUDY THE VARIATION OF THESE PHENOMENA WITH TIME, SOLAR ACTIVITY, AND MAGNETIC ACTIVITY AND THE RELATION OF THESE VARIATIONS TO IONOSPHERIC FROCESSES.

ON 12/18/72. THE SPACECRAFT MISSICN WAS AFFROVED.

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SPACECRAFT COMMON NAME- CAS-8
ALTERNATE NAMES- FR-28. PL-702A, COOPERATIVE APPLICA.SAT.

PLANNED LAUNCH DATE- / / SPACECRAFT WEIGHT IN ORBIT- 934. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY FRANCE

UNITED STATES NASA-GSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERICD- 113. MIN
APPAPSIS- 900.000 KM ALT PERIAPSIS- 500.000 KM ALT INCLINATION- 50. DEG

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER, FS=PROJECT SCIENTIST)

PM - M. TROUBLE CEN GIF-SUR-YVETTE. FRANCE
PS - P. MOREL CEN GIF-SUR-YVETTE. FRANCE

PS - W.R. BANDEEN NASA-GSFC GREENEELT. MD

SPACECRAFT BRIEF DESCRIFTION

CAS-A WILL BE A GRAVITY-GRADIENT STABILIZED SATELLITE WHICH WILL FUNCTION PRIMARILY AS A COMMUNICATIONS SATELLITE TO RELAY MEATHER OBSERVATIONS OF ALTITUCE, PRESSURE, TEMPERATURE, NCISTUFE, AND EALLOON LOCATION FROM CONSTANT DENSITY BALLOGNS. AN ADDITIONAL PURPOSE WILL BE TO OBSERVE SUCCESSIVE BALLOON POSITIONS IN CROER TO MAKE WINCS AT BALLOON LEVEL. SATELLITE SPIN IS EXPECTED TO BE NEAR ZERO RFM IN CREIT, AND THE ATTITUDE WILL BE STABLE WITHIN 9 DEG OF LOCAL VERTICAL. MAGNETOMETERS AND SOLAR SENSORS WILL BE ON BOARD FOR DETERMINATION OF ATTITUDE. DATA WILL BE STORED ON BOARD THE SPACECRAFT AND UNLOADED ON COMMAND WHEN THE SFACECRAFT IS IN RANGE OF THE GROUND STATION.

ON / / . THE SPACECRAFT MISSION WAS

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SPACECRAFT COMMON NAME- CAS-C NSSDC ID CAS-C

ALTERNATE NAMES- COOPERATIVE APPLICA . SAT.

PLANNED LAUNCH DATE- 11/00/74 SPACECRAFT WEIGHT IN DREIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY

CRC-NASA
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERICO- MIN

APOAPSIS- 29622.0 KM ALT PERIAPSIS- 29622.0 KM ALT INCLINATION-

DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT IS DESIGNED AS A TEST VEHICLE TO SUFPORT TECHNOLOGICAL EQUIPMENT RELATING TO A HIGH-FREQUENCY COMMUNICATIONS SATELLITE. EXPERIMENTS WILL INCLUDE A 12-GHZ COMMUNICATIONS TV AND VOICE COMMUNICATIONS EXPERIMENTAL SYSTEM CESIGNED TO SERVE ISOLATED AND OR SWALL COMMUNITIES. A TRANSMITTER POWER TUBE TEST, A SOLAR CELL ARRAY TEST. AN ELECTRIC SPACECRAFT PROPULSION TEST, AND A SPECIALIZED SPACECRAFT STABILIZATION SYSTEM TEST. THE SATELLITE IS TO BE INSERTED IN GEOSYNCHRONOUS CRBIT IN 1974.

ON / / THE SPACECRAFT MISSION WAS

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SPACECRAFT COMMON NAME- CORSA ALTERNATE NAMES- COSMIC RAY

CORSA NSSCC IC CORSA COSMIC RAY SATELLITE

PLANNED LAUNCH DATE- 00/00/75

SPACECRAFT WEIGHT IN ORBIT-

70. KG

LAUNCH SITE- KAGOSHIMA. JAPAN

LAUNCH VEHICLE- M-35-C

FUNDING AGENCY

JAPAN

TOKYO U

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERICO- PIN

APDAPSIS- 6878. KM ALT

PERIAPSIS- EETE. KM ALT INCLINATION-

30 . DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. FS=PROJECT SCIENTIST)

PM - M. ODA PS - S. HAYAKAWA U OF TOKYO NAGOYA U

TCKYC. JAFAN NAGOYA, JAPAN

SPACECRAFT BRIEF DESCRIPTION

THE COSMIC RACIATION SATELLITE WILL HAVE A CYLINDRICAL SHAPE. A
DIAMETER OF 75 CM. AND A FEIGHT OF 60 CM. THE SPACECRAFT WILL BE STABILIZED
WITH THE SPIN AXIS CONTROLLED TO POINT IN A NORTH-SOUTH DIRECTION. SIX
THOUSAND SOLAR CELLS MOUNTED ON THE SIDE SURFACE WILL PROVIDE A TOTAL
ELECTRIC POWER OF 15 W. THE PRIMARY DEJECTIVES OF THE SATELLITE WILL BE TO
MEASURE VARIOUS COSMIC RADIATIONS IN ORDER TO STUDY THE ORIGIN AND
PROPAGATION MECHANISMS OF SUCH QUANTA.

ON 05/00/71. THE SPACECRAFT MISSIGN WAS PROPOSED.

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SPACECRAFT COMMON NAME - COS-E
ALTERNATE NAMES - COSMIC RAY SATELLITE-B; PL-7418

PLANNED LAUNCH DATE- 02/00/75 SPACECRAFT WEIGHT IN CRBIT- 100. KG

LAUNCH SITE- LAUNCH VEHICLE- EURCPA 2

FUNDING AGENCY
INTERNATIONAL ESRO

I HI EKNAT TONOL

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 2230. MIN

APOAPSIS- 100000. KM ALT PERIAPSIS- 350.000 KM ALT INCLINATION- 20. DEG

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER, FS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION

THE COS-B SPACECRAFT WILL BE USED FRIMARILY TO STUDY EXTRATERRESTRIAL GAMMA RADIATION. THE OBJECTIVES OF THE COS-B MISSICN WILL BE (1) TO ESTABLISH THE INTENSITY OF THE AVERAGE GAMMA-RAY FLUX. (2) TO EXAMINE THE LARGE-SCALE ANISDTROPY OF RADIATION OVER ANGULAR REGIONS CORRESPONDING TO GALACTIC FEATURES. (3) TO SEARCH FOR AND EXAMINE RADIO AND X-RAY SCURCES OF SMALL ANGULAR SIZE. ESPECIALLY THOSE SUCH AS SUPERNOVA REMNANTS AND QUASARS. (4) TO MEASURE THE ENERGY SPECTRA OF THE FADIATION. AND (5) TO SEARCH FOR LONG-TERM TIME VARIATIONS. AS OBSERVED IN SOME X-RAY SOURCES. AND FOR THE SHORT-TERM VARIATIONS CHARACTERISTIC OF PULSARS. THE CYLINDRICAL SPACECRAFT WILL BE SPIN STAELLIZED. WITH THE GAMMA-RAY TELESCOPE CRIENTED ALONG THE SPACECRAFT SPIN AXIS. THE SPACECRAFT WILL BE LAUNCHED INTO A HIGHLY ECCENTRIC ORBIT SO THAT IT WILL SPEND MOST OF THE TIME OUTSIDE THE RADIATION BELTS.

ON 01/00/73, THE SPACECRAFT MISSICN WAS APPROVED.

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SPACECRAFT COMMON NAME- DAUGHTER
ALTERNATE NAMES- IMP-K PRIME. IME-D

NSSCC IC CAUGHTR

PLANNED LAUNCH DATE- 11/00/75 SPACECRAFT WEIGHT IN ORBIT- 120. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES NASA-OSS
INTERNATIONAL ESRO

PLANNED OREIT PARAMETERS

ORBIT TYPE- CEOCENTRIC ORBIT PERICD- MIN
APDAPS IS- 131000 · KM ALT PERIAPSIS- 500 · KM ALT JINCLINATION- 28 · DEG

SPACECRAFT PERSONNEL (PM = PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - A. HAWKYARD EUR SPACE TECH CENTER NOORDWIJK, THE NETHERLANDS

PS - D.E. PAGE EUR SPACE TECH CENTEF NCCFONIJK, THE NETHERLANDS

SPACECRAFT ERIEF DESCRIPTION

THE EXPLORER CLASS CALGHTER SPACECRAFT IS FART OF THE MOTHER/DAUGHTER/HELIOCENTRIC MISSION. THE PURPOSES OF THE MISSION WILL BE ~~ (1) TO INVESTIGATE SOLAR-TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE. (2) TO EXAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH. AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERFLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMPOSPACECRAFT. THE MOTHER/DAUGHTER PORTION OF THE MISSION WILL CONSIST OF TWO SPACECRAFT WITH A STATION-KEEPING CAPABILITY IN A HIGHLY ECCENTRIC EARTH ORBIT WITH APOGEE FROM 18 TO 23 EARTH RADII. THE SPACECRAFT WILL MAINTAIN A SMALL SEPARATION DISTANCE. AND WILL MAKE SIMULTANEOUS COORDINATED MEASUREMENTS TO PERMIT SEPARATION OF SPATIAL FROM TEMPORAL IRREGULARITIES IN THE NEAR-EARTH SOLAR WIND. THE BOW SHOCK, AND INSIDE THE MAGNETOSPHERE.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 50-EV TO 40-KEV FROTON AND SHEV TO 20-KEV ELECTRON PLASMA PROBE

NSSDC ID CAUGHTR-01

EXPERIMENT	PERSONNEL (PI=PRINCIP	AL INVESTIGATOR. DI=CT	HER INVESTIGATOR)
PI - G.		MAX PLANCK INST	GERMANY
DI - w.C.	FELDMAN	NASA-ARC	MOFFETT FIELD. CA
01 - E.W.	HONES	LOS ALAMOS SCI LAB	LOS ALANCS, NM
GI - K.		MAX PLANCK INST	GERMANY
	MIGGENRIFOER	MAX PLANCK INST	GERMANY
01 - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS. NM
.H - 10	VOLK	M.PLANCK INST. GARCHING	GARCHING. W. GERMANY
01 - H.R.	RÓS EN E AU ÉR	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALANOS, NM

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE PLASMA VELOCITY DISTRIBUTIONS AND THEIR SPATIAL AND TEMPORAL VARIATIONS IN THE SCLAR WIND, BOW SHOCK, MAGNETOSHEATH, MAGNETOPAUSE, AND MAGNETOTAIL (WITHIN THE MAGNETOSHERE). ONE-, TWO-, AND THREE-DIMENSIONAL VELOCITY DISTRIBUTIONS FOR POSITIVE IONS AND ELECTRONS WILL BE MEASURED USING TWO 90-DEG SPHERICAL ELECTROSTATIC ANALYZERS WITH CHANNELTRON ELECTRON MULTIPLIERS AS DETECTORS. IN CONJUNCTION WITH SIMILAR INSTRUMENTATION PROVIDED BY S. J. BAME/LASL FOR THE MOTHER SPACECRAFT, PROTONS FROM SO BY TO 40 KEV (AND ELECTRONS FROM 5 BY TO 20 KEV) WILL BE MEASURED WITH 10 PERCENT ENERGY RESOLUTION IN TWO RANGES EACH.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 50-EV TO 25-KEV ION AND 35-EV TO 7-KEV NSSCC ID CAUGHTR-02
ELECTRON PLASMA PROBES

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL I	NVESTIGATOR .	DI=CTHER INVESTIGATOR)
PI - A.	EGIDI	UDF	ROME	ROME. ITALY
01 - G.	MORENO	. L CF	ROME	RCME. ITALY
OI - P.	CERULL I	U OF	ROME	ROME, ITALY
01 - V.	FORMISANO	U OF	ROME	ROME, ITALY
01 - 5.0.	CANTARAND	U OF	ROME	ROME, ITALY

EXPERIMENT BRIEF CESCRIPT ION

THE DEJECTIVE OF THIS EXPERIMENT WILL BE TO GAIN A BETTER UNDERSTANDING OF THE INTERACTION OF THE SCLAR WIND WITH THE EARTH'S MAGNETIC FIELD BY MEASURING ION AND ELECTRON FLUXES AS FUNCTIONS OF DIRECTION AND ENERGY. ONE ELECTROSTATIC ANALYZER AND FIVE FARADAY CUFS WILL BE USED TO MEASURE THE ION DISTRIBUTION FUNCTION FROM SO EV TO 25 KEV PER UNIT CHARGE. TWO FARADAY CUPS WILL BE USED TO MEASURE THE ELECTRON DISTRIBUTION FUNCTION FROM 36 EV TO 7 KEV. THE ELECTROSTATIC ANALYZER WILL HAVE SEVERAL NARROW ENERGY WINDOWS TO MAP THE PARTICLE (ION AND ELECTRON) DISTRIBUTION FUNCTION IN DETAIL. EACH OF THE FIVE FARADAY CUP-CHANNELTRON DETECTORS WILL SERVE AS FLUX DETECTORS TO SIMULTANEOUSLY MAP THE ION DISTRIBUTION FUNCTION TO A COARSE ENERGY RESOLUTION. EACH OF THE TWO FARADAY CUP-CHANNELTRON DETECTORS WILL SERVE AS A FLUX DETECTOR TO MAP THE ELECTRON DISTRIBUTION FUNCTION TO COARSE ENERGY RESOLUTION.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROFCSED.

EXPERIMENT NAME- HOT PLASMA

NSSCC ID CAUGHTR-03

EXPERIMENT PERSUNNEL {PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR)
PI + L.A. FRANK U OF IOWA IOWA CITY, IA
CI + V.M. VASYL IUNAS MIT CAMBRIDGE. MA
CI + C.F. KENNEL U OF CALIFORNIA. LA LOS ANGELES, CA

### EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE MCTHER/DAUGHTER SPACECRAFT. THE SPATIAL AND TEMPORAL VARIATIONS OF THE SOLAR WIND AND MAGNETCSHEATH ELECTRONS AND IONS. PROTONS AND ELECTRONS IN THE ENERGY RANGE FROM 1 EV TO 50 KEV WILL BE MEASURED IN 63 CONTIGUOUS ENERGY BANDS WITH AN ENERGY RESOLUTION (DELTA E/E) OF 0.17. A QUADRISPHERICAL LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), EMPLOYING SEVEN CONTINUOUS CHANNEL ELECTRON MULTIPLIERS IN EACH OF ITS TWO (ONE FOR PROTONS AND ONE FOR ELECTRONS) ELECTROSTATIC ANALYZERS WILL BE FLCWN ON BOTH MCTHER AND DAUGHTER SPACECRAFT. ALL BUT 2 PERCENT OF THE FOUR PI STER SOLID-ANGLE WILL BE COVERED FOR PARTICLE VELOCITY VECTORS.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROFCEED.

EXPERIMENT NAME- MAGNETIC FIELDS

NSSCC ID DAUGHTR-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PI - C.T. RUSSELL U OF CALIFORNIA, LA LOS ANGELES, CA

OI - R.L. MCP+ERRON U OF CALIFORNIA, LA LOS ANGELES, CA

OI - HEDGECOCK IMPERIAL COLLEGE LONGON, ENGLAND

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNET CMETER THAT WILL MEASURE THE STEADY MAGNETIC FIELD AND ITS LOW-FREQUENCY VARIATIONS. THREE FIELD ANFLITUDE RANGES (MINUS TO PLUS 16. 64. AND 2048 GAMMAS) WILL BE AVAILABLE WITH RESOLUTION OF MINUS TO PLUS 1/32. 1/4. 1/16 GAMMA. RESPECTIVELY. THE FREQUENCY RESPONSE WILL BE 0 TO 10 HZ. AN IDENTICAL INSTRUMENT WILL BE FLOWN ON THE NOTHER SPACECRAFT. PERMITTING SEPARATION OF TEMPORAL AND SPATIAL MAGNETIC FLUCTUATIONS.

ON 01/09/73. THE SPACECRAFT MISSIGN WAS PROPOSED.

EXPERIMENT NAME- 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO NSSDC ID DAUGHTR-05 200-KHZ ELECTRIC FIELD MONGAXIAL PROBES

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) PI - D.A. GURNETT U OF IOWA IOWA CITY, IA 91 - F.L. SCARF TRW SYSTEMS GROUP RECONCO BEACH, CA 01 - E.J. SMITH NA SA-JPL PASADENA, CA 01 - R.W. FREDERICKS TRW SYSTEMS GROUP FEDGNOO EEACH, CA

#### EXPERIMENT BRIEF DESCRIPTION

IN THIS EXPERIMENT, A SINGLE-AXIS SEARCH COIL MAGNETOMETER WITH A HIGH PERMEABILITY CORE AND A SINGLE ELECTRIC FIELD DIPCLE (RELATIVELY SHORT) WILL MEASURE WAVE PEROMENON OCCURRING WITHIN THE MAGNETOSPHERE AND SCLAR WIND IN CONJUNCTION WITH A SIMILAR EXPERIMENT FLOWN ON THE MOTHER SPACECRAFT. THE TIME REQUIRED FOR A 16-CHANNEL SPECTRUM ANALYSIS IN A RANGE OF 10 HZ TO 10 KHZ FROM THE SEARCH COIL WILL BE 100 MS. THE TIME REQUIRED FOR A 16-CHANNEL SPECTRUM ANALYSIS IN A RANGE OF 10 HZ TO 200 KHZ FROM THE ELECTRIC DIPOLE WILL ALSO BE 100 MS. THE DIPOLE WILL BE NOUNTED PERPENCICULAR TO THE SPIN AXIS.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- RACIO PROPAGATION RECEIVER

NESDC ID DAUGHTR-06

EXPER IMENT	PERSONNEL	(PI≃PRINCIPAL INVESTIGATOR, GI≂CT	HER INVESTIGATOR)
PI ~ C.C.	HARVEY		PARIS, FRANCE
OI - R.	GENDRIN	CNET	PARIS. FRANCE
01 - J.R.	MCAFEE	NOAA	BOULDER. CO
01 - M.	PETIT	CNET	FARIS, FRANCE
OI - D.	JONES	EUR SPACE TECH CENTER	NCCEDALJK - THE NETHERLANDS
01 - J.M.		CNET.	PARIS, FRANCE
GI ~ R.J.L.	GRARD	EUR SPACE TECH CENTER	ACCECALLE THE NETHERLANDS

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN RF TRANSMITTER ON THE MCTHER SATELLITE AND A RECEIVER ON THE DAUGHTER SATELLITE. THE TRANSMITTER WILL EMIT SIGNALS WITH A KNOWN PHASE RELATIONSHIP AT TWO CLOSELY SPACED FREQUENCIES NEAR 300 MHZ. THE REALTIVE PHASE DELAY OF THE LOWER FREQUENCY WILL BE OBSERVED BY THE RECEIVER. THIS PHASE DELAY IS CAUSED BY THE DIFFERENT EFFECT OF THE ELECTRONS ALONG THE PROPAGATION PATH ON THE TWO DIFFERENT SIGNAL FREQUENCIES INVOLVED. THESE PHASE DELAY COSERVATIONS WILL BE CONVERTED INTO TOTAL ELECTRON CONTENT BETWEEN THE TWO SPACECRAFT, AND THEN NORMALIZED TO A STANGARD LENGTH PATH.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NESDC ID CAUGHTR-07

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, DIEDTHER INVESTIGATOR)

BCULDER. CO NOAA-ERL PI - D.J. WILLIAMS BCLLDER. CO NGAA FRITZ .A.T - 10 APPLIED PHYSICS LAB SILVER SPRING. MD 01 - C.O. BOSTROM LINCAU. W. GERMANY M.PLANCK INST.LINDAU 01 - E. KEPPLER M.PLANCK INST.LINDAU LINDAU. W. GERMANY WILKER 01 - B. KIEL. W. GERMANY U OF KIEL 01 - G. w 188ERENZ

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO IDENTIFY AND TO STUDY PLASMA INSTABILITIES RESPONSIBLE FOR ACCELERATION. SOURCE AND LOSS MECHANISMS. AND BOUNDARY AND INTERFACE PHENOMENA THROUGHOUT THE ORBITAL RANGE OF MCTHER/ DAUGHTER SATELLITES. A PROTON TELESCOPE AND AN ELECTRON SPECTROMETER WILL BE FLOWN ON EACH SPACECRAFT TO MEASURE DETAILED ENERGY SPECTRA AND ANGULAR DISTRIBUTIONS. THESE DETECTORS WILL USE SILICON, SURFACE-BARRIER. TOTALLY CEPLETED SOLID-STATE DEVICES OF VARIOUS THICKNESSES, AREAS, AND CONFIGURATIONS. PROTONS IN 4 AND 16 CHANNELS BETWEEN 25 KEY AND 2 MEY AND ELECTRONS IN 4 AND 16 CHANNELS BETWEEN 20 KEY AND 2 MEY WILL BE MEASURED.

ON 01/09/73. THE SPACECRAFT MISSICH WAS PROFOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSDC ID DAUGHTR-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=(THER INVESTIGATOR) U OF CALIFORNIA. BERK BERKELEY, CA PI - K. A. ANDERSON L OF CALIFCRNIA, BERK EERKELEY, CA .1.3 - IB MENG TOULDUSE, FRANCE BOSQUED PAUL SABATIER U -M.L - 10 PALL SABATIER U TCULCUSE. FRANCE at - R. PELLAT U OF CALIFORNIA, LA LOS ANGELES. CA PAUL SABATIER U TOULOUSE, FRANCE 01 - F.V. CORONITI TCULQUSE, FRANCE 01 - H. REME L OF CALIFCRNIA. BERK BERKELEY. CA DI - R.P. LIN L OF WASHINGTON SEATTLE. WA 01 - G.K. PARKS

### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO DETERMINE. BY USING IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT. THE SPATIAL EXTENT, PROPAGATION VELOCITY, AND TEMPCRAL BEHAVIOR OF A WICE VARIETY OF PARTICLE PHENCHENA. ELECTRONS WILL BE MEASURED IN IND INTERVALS OVER THE ENERGY RANGE FROM 8 TO 200 KEV. AND PROTONS WILL BE MEASURED IN THREE INTERVALS OVER THE ENERGY RANGE FROM 10 TO 380 KEV. IDENTICAL INSTRUMENTATION ON EACH SPACECRAFT WILL CONSIST OF A PAIR OF SURFACE BARRIER SEMICONDUCTOR CETECTOR TELESCOPES (ONE WITH A FOIL AND ONE WITHOUT A FOIL) AND FOUR FIXED-ENERGY ELECTRIC FIELD PARTICLE ANALYZERS. THESE ANALYZERS WILL BE USED TO MEASURE ELECTRONS AND PROTONS SEPARATELY AT 2 AND 6 KEV.

ON 01/09/73. THE SPACECRAFT MISSICN WAS PROFOSED.

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SPACECRAFT COMMON NAME- DIAPO ALTERNATE NAMES-

NSSCC ID CIAFO

PLANNED LAUNCH CATE- 12/00/75 SPACECRAFT WEIGHT IN CRBIT-

KG

LAUNCH VEHICLE- DIAMANT

LAUNCH SITE- KOUROR, FRENCH GUIANA, FRANCE

FUNDING AGENCY FRANCE

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC APDAPSIS- 2500 KM ALT DRBIT PÉRICC-

PER IAPS IS-

MIN

300. KM ALT INCLINATION-

80. DEG

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF FRANCE'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. ITS CBJECTIVES WILL BE TO STUDY THE ORIGIN AND ACCELERATION MECHANISMS OF MAGNETOSPHERIC TONS (1) BY MEASURING THE RELATIVE ABUNDANCES AND THE ANGULAR AND ENERGY DISTRIBUTION OF SINGLY TONIZED HYDROGEN AND FELIUM, DOUBLY IONIZED HELILM, AND CXYGEN (6 FLUS) TONS AND (2) BY COMPAFING THE RESULTS WITH THE IONOSPHERIC AND SCLAR WIND COMPOSITION, ADDITIONALLY, A STUDY OF MAGNETOSPHERIC SUBSTORMS IS PLANNED WITH MEASUREMENTS OF THE ANGULAR AND ENERGY DISTRIBUTION OF ELECTRONS FROM SO EV TO 1 MEV, COMPLEMENTED WITH VLF AND MAGNETIC FIELD MEASUREMENTS.

ON 05/09/73. THE SPACECRAFT MISSICN WAS PROFESED.

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SPACECRAFT COMMON NAME- DUAL-A ALTERNATE NAMES- NESDC ID DUAL-A

PLANNED LAUNCH DATE- 08/00/75

SPACECRAFT WEIGHT IN CREIT-

KG

LAUNCH SITE-

LAUNCH VEHICLE- UNDISC

FUNDING AGENCY
U-S-S-R-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION

TWO SATELLITES, DUAL-A AND DUAL-A1, WILL BE LAUNCHED SIMULTANEOUSLY BY THE U.S.S.R. AND WILL BE PLACED IN ELONGATED ORBITS WITH THE DIRECTION OF THE LINE OF APSICES TOWARD THE NEUTRAL POINTS OF THE MAGNETOSPHERE. THE SATELLITES WILL BE PART OF THE U.S.S.R. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THEY WILL PERFORM CESERVATIONS SIMULTANEOUSLY IN CRITICAL REGIONS OF THE EARTH'S PLASMA ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE MAGNETOMETERS AND PLASMA AND ENERGETIC PARTICLE DETECTORS.

ON 01/10/73. THE SPACECRAFT MISSION WAS UNKNOWN.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SPACECRAFT COMMON NAME- DUAL-A1 ALTERNATE NAMES-

ASSCC ID DUAL-A1

PLANNED LAUNCH DATE- 08/00/75

SPACECRAFT WEIGHT IN CRBIT-

KG

LAUNCH SITE-

LAUNCH VEHICLE- UNDISC

FUNDING AGENCY

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT ERIEF DESCRIPTION

TWO SATELLITES, DUAL-A AND DUAL-A1, WILL BE LAUNCHED SIMULTANEOUSLY BY THE U.S.S.R. AND WILL BE PLACED IN ELONGATED ORBITS WITH THE DIRECTION OF THE LINE OF APSICES TOWARD THE NEUTRAL FRINTS OF THE MAGNETOSPHERE. THE SATELLITES WILL BE PART OF THE U.S.S.R. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THEY WILL PERFORM OBSERVATIONS SIMULTANEOUSLY IN CRITICAL REGIONS OF THE EARTH'S PLASMA ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE MAGNETOMETERS AND PLASMA AND ENERGETIC FAFTICLE DETECTORS.

ON 01/10/73. THE SPACECRAFT MISSIGN WAS UNKNOWN.

SPACECRAFT COMMON NAME- ERTS-E

NEEDC ID ERTS-E

ALTERNATE NAMES -

EARTH RES. TECH SAT.-B, PL-7330

PLANNED LAUNCH DATE- 11/00/73

SPACECRAFT WEIGHT IN ORBIT- 816.

LAUNCH SITE- VANDENBERG AFB, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NASA-OSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- 103. MIN

APGAPSIS- 912.000 KM ALT PERIAPSIS- \$12.000 KM ALT INCLINATION- 99.088 DEG

SPACECRAFT PERSONNEL (PM=PRCJECT MANAGER, FS=PROJECT SCIENTIST)

PM - S. WEILAND

NASA-GSFC

GREENEELT. MD

PS - W.P. NORDBERG

NASA-GSFC

GREENBELT. MD

#### SPACECRAFT BRIEF DESCRIPTION

THE EARTH RESOURCES TECHNOLOGY SATELLITE ERTS-E WILL EE A MCCIFIED VERSION OF THE NIMBUS 4 METEGROLOGICAL SATELLITE. THE NEAR-FCLAR CRBITING SPACECRAFT WILL SERVE AS A STABILIZED. EARTH-GRIENTED FLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL AND FORESTRY RESOURCES, GECLOGY AND MINERAL RESOURCES, HYDROLOGY AND WATER RESOURCES, GECGRAFFY, CARTCGRAPHY. ENVIRONMENTAL POLLUTION, OCEANOGRAPHY AND MARINE RESOURCES, AND METEOROLOGICAL FLENCMENA. TO ACCOMPLISH THESE OBJECTIVES THE SPACECRAFT WILL

BE EQUIPPED WITH (1) A FOUR-CHANNEL MULTISPECTRAL SCANNER (MSS) AND A -- THREE-CAMERA RETURN BEAM VIDICON (RBV) TO OBTAIN BOTH VISIBLE AND INFRARED PHOTOGRAPHIC AND RADICMETRIC IMAGES OF THE EARTH, (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS. ERTS-B WILL CARRY TWO WIDE-EAND VIDEO TAPE RECORDERS (WBVTR) CAFABLE OF STORING UP TO 30 MIN OF SCANNER OR CAMERA DATA TO GIVE THE SPACECRAFT'S SENSORS A NEAR-GLOBAL COVERAGE CAPABILITY. AN ADVANCED ATTITUDE CONTROL SYSTEM CONSISTING OF HORIZON SCANNERS, SUN SENSORS, AND A COMMAND ANTENNA COMBINED WITH A FREON GAS PROPULSION SYSTEM WILL PERMIT THE SPACECRAFT'S CRIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 0.7 DEG IN ALL THREE AXES. SPACECRAFT COMMUNICATIONS WILL INCLUDE A COMMAND SUBSYSTEM OPERATING AT 154.2 AND 2106.4 MHZ AND A PULSE CODE MODULATED (PCM) NARROW-BAND TELEMETRY SUBSYSTEM, OPERATING AT 2267.5 AND 137.86 MHZ. FOR SPACECRAFT HOUSEKEEPING. ATTITUDE. AND SENSOR PERFORMANCE DATA - VIDEO DATA FROM THE THREE-CAMERA REV SYSTEM WILL BE TRANSMITTED IN BOTH REAL TIME AND FROM THE WIDE-BAND RECORDER SYSTEM AT 2265.5 MHZ. WHILE INFORMATION FROM THE MSS WILL BE CONSTRAINED TO A 20-MHZ RF BANDWICTH AT 2229.5 MHZ.

ON 00/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RETURN BEAM VIDICON (RBV) CAMERA SYSTEM NSSCC ID ERTS-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=CTHER INVESTIGATOR)
PI - O. WEINSTEIN NASA-GSFC GREENBELT, NO
OI - T.M. RAGLAND NASA-GSFC GREENBELT, MD

#### EXPERIMENT ERIEF CESCRIPTION

THE ERTS-E RETURN BEAM VIDICON (RBV) CAMERA SYSTEM WILL CONTAIN THREE INDEPENDENT CAMERAS COVERING THE THREE SPECTRAL BANDS FROM ELUE-GREEN (0.47 TO 0.575 MICRON) THROUGH YELLOW-RED (0.58 TO 0.68 MICRON) TO NEAR INFRARED (0.69.TO 0.83 MICRON). WHILE DESIGNED FRIMARILY TO DETAIN INFORMATION FOR EARTH RESOURCE TYPE STUDIES. THE RBV CAMERA SYSTEM WILL ALSO BE USED TO CONDUCT METEOROLOGICAL STUDIES. I.E., TO INVESTIGATE ATMOSPHERIC ATTENUATION AND TO OBSERVE MESOSCALE PHENOMENA, WINTER MONSOON CLOUDS (JAPAN), SNOW COVER, ETC. THE THREE EARTH-DRIENTED CAMERAS WILL BE MOUNTED TO A COMMON BASE. STRUCTURALLY ISOLATED FROM THE SPACECRAFT TO MAINTAIN ACCURATE ALIGNMENT. EACH CAMERA WILL CONTAIN AN OPTICAL LENS, A 5.08-CM RETURN BEAM VIDICON. A THERMOELECTRIC COOLER DEFLECTION AND FOCUS COILS. A MECHANICAL SHUTTER, ERASE LAMPS, AND SENSOR ELECTRONICS. THE CAMERAS WILL BE SIMILAR EXCEPT FOR THE SPECTRAL FILTERS CONTAINED IN THE LENS ASSEMBLIES THAT PROVIDE SEPARATE SPECTRAL VIEWING REGIGNS. THE VIEWED GROUND SCENE. 185 BY 185 KM.IN AREA, WILL BE STORED ON THE PHOTOSENSITIVE SUFFACE OF THE CAMERA TUBE, AND, AFTER SHUTTERING, THE IMAGE WILL BE SCANNED BY AN ELECTRON BEAM TO PRODUCE A VIDEO SIGNAL OUTPUT. EACH CAMERA WILL BE READ OUT SEQUENTIALLY. REQUIRING ABOUT 3.5 SEC FOR EACH OF THE SFECTRAL IMAGES. THE CAMERAS WILL BE RESHUTTERED EVERY 25 SEC TO PRODUCE OVERLAPPING I MAGES ALCNG THE CIRECTION OF SPACECRAFT MOTION. VIDEO DATA FROM THE RBV WILL BE TRANSMITTED (2265.5) IN BOTH REAL-TIME AND TAPE RECORDER MODES. FROM A NOMINAL SPACECRAFT ALTITUDE OF 912 KM. THE REV WILL HAVE A HORIZONTAL RESCLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT WILL BE HANDLED BY THE NASA DATA PROCESSING FACILITY. GSFC. GREENBELT. MD., AND WILL SE MADE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS WILL BE ABLE TO OBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, CEPARTMENT OF THE INTERIOR, SICLX FALLS, S.O.

UN 00/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MULTISPECTRAL SCANNER (MSS)

NESOC ID ERTS-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTER INVESTIGATOR)
PI - UNKNOWN LNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE ERTS-E MULTISPECTRAL SCANNER (MSS) WILL PROVICE REPETITIVE DAY/NIGHT ACQUISITION OF HIGH-RESOLUTION MULTISPECTRAL DATA OF THE EARTH'S SURPACE ON A GLOBAL BASIS. WHILE ITS PRIMARY FUNCTION WILL BE TO GETAIN INFORMATION IN VARIOUS AREAS SUCH AS AGRICULTURE, FORESTRY, GEOLOGY, AND HYDROLOGY. THE MSS SYSTEM WILL ALSO BE USED FOR OCEANGGRAPHIC AND METEOROLUGICAL PURPOSES, I.E., TO MAP SEATICE FIELDS, LECATE AND TRACK MAJOR OCEAN CURRENTS. MONITOR BOTH AIR AND WATER POLLUTION. DETERMINE SNOW COVER. INVESTIGATE SEVERE STORM ENVIRONMENTS. ETC. THE MSS WILL CONSIST OF A 22.86-CM DOUBLE REFLECTOR-TYPE TELESCOPE, SCANNING MIRROR, FILTERS, DETECTORS, AND ASSOCIATED ELECTRONICS. THE SCANNER WILL OPERATE IN THE FOLLOWING SPECTRAL INTERVALS -- BAND 1 - 0.5 TO 0.6 MICRON. BAND 2 - 0.6 TO 0.7 MICRON. EANE 3 - 0.7 TO 0.8 MICRON, BAND 4 - 0.8 TO 1.1 MICRONS. AND BAND 5 - 10.4 TC 12.6 MICRONS. THIS LAST BAND. WHICH LIES IN THE THERMAL (ENISSIVE) PART OF THE SPECTRUM, WILL GIVE ERTS-B NIGHTTIME SENSING CAPABILITIES. A FEATURE LACKING IN THE MSS ON EFTS 1. INCOMING RACIATION WILL BE COLLECTED BY THE SCANNING MIRROR. WHICH WILL OSCILLATE 2.89 DEG TO EITHER SIDE OF NADIR AND SCAN CROSS-TRACK SWATHS 185 KM WIDE. THE ALONG-TRACK SCAN WILL BE FRODUCED BY THE ORBITAL MCTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCED AT THE IMAGE PLANE WILL BE RELAYED BY USE OF FIBER-OPTIC BUNCLES TO DETECTORS WHERE CONVERSION TO AN ELECTRONIC SIGNAL WILL BE ACCOMPLISHED. OPTICAL FILTERS WILL BE USED TO PRODUCE THE DESIRED SPECTRAL SEPARATION. SIX DETECTORS WILL BE EMPLOYED IN EACH OF THE FIRST FOUR SPECTRAL EARDS AND TWO IN THE FIFTH BAND -- EARDS 1 THROUGH 3 WILL USE PHOTOMULTIPLIER TUBES AS DETECTORS, BAND & WILL USE SILICON PHOTOCIOCES, AND BAND 5 WILL USE MERCURY-CADMIUM-TELLURIDE DETECTORS. A MULTIPLEXER INCLUDED IN THE MSS SYSTEM WILL PROCESS THE SCANNER'S 26 CHANNELS OF DATA. THESE DATA WILL BE TIME-MULTIPLEXED AND THEN CONVERTED TO A FULSE-CODE MODULATED (PCM) SIGNAL BY AN A/C CONVERTER. THE DATA WILL THEN BE TRANSMITTED (2229.5 MHZ) DIRECTLY TO AN ACQUISITION STATION OR STORED ON MAGNETIC TAPE FOR SUBSECUENT PLAYBACK THE NEXT TIME THE SPACECRAFT COMES WITHIN COMMUNICATION RANGE OF AN ACQUISITION STATION. DATA FROM THIS EXFERIMENT WILL BE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD., AND WILL BE MADE AVAILABLE TO APPROVED INVESTIGATORS THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INCIVIDUALS WILL BE ABLE TO CHTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, CEPARTMENT OF THE INTERIOR, SICUX FALLS, S.D.

ON 00/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DATA CELLECTION SYSTEM (DCS)

NSSCC ID ERTS-B -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE ERTS-E DATA COLLECTION SYSTEM (DCS) WILL PROVIDE USERS WITH NEAR REAL-TIME DATA COLLECTED FROM VARIOUS REMOTE LOCATIONS. THE DCS WILL BE

COMPOSED OF THREE DISTINCT SUBSYSTEMS -- (1) THE DATA COLLECTION PLATFORMS (DCP S), (2) THE SATELLITE EQUIPMENT, AND (3) THE GROUND DATA CENTERS, WHICH INCLUDE REMOTE RECEIVING SITES AND THE GROUND DATA HANGLING SYSTEM AT GSFC. USE OF THE ERTS SPACEBORNE DCS WILL FROVIDE A CONTINUAL FLOW OF INFORMATION FOR BETTER MANAGEMENT OF WILDLIFE, MARINE, AGRICULTURE, WATER, AND FORESTRY RESOURCES AND WILL LEAD TO IMPROVED WEATHER FORECASTS, POLLUTION CONTROL. AND EARTHQUAKE PRECICTION AND WARNING. THE ENVIRONMENTAL SENSORS TO BE MOUNTED ON A DCP WILL BE SELECTED BY INDIVIDUAL INVESTIGATORS TO SATISFY THEIR PARTICULAR REGUIREMENTS. FROM A FLANNED CRBIT OF 512 KM. THE SPACECRAFT WILL BE CAPABLE OF ACQUIRING DATA FROM DCP S WITHIN A RADIUS OF 3143 KM FROM THE SUESATELLITE POINT, THUS ALLOWING DATA TO BE OBTAINED FROM ANY REMOTE PLATFORM AT LEAST CNCE EVERY 12 HR. THE DCF S WILL TRANSMIT AT 401.55 MHZ. LACKING INTERROGATION CAPABILITIES. THE DCS EQUIPMENT IN THE SPACECRAFT IS ESSENTIALLY A RECEIVER. THE DATA WILL BE SIMPLY RECEIVED AND RETRANSMITTED (AT 2287.5 MHZ) TO SELECTED GROUND RECEIVING STATIONS. THERE WILL BE NO SIGNAL MULTIPLEXING OR DATA PROCESSING ON THE SATELLITE. THE ERTS DCS WILL BE DESIGNED TO ACCEMMODATE UP TO 1000 DCP S DEPLOYED THROUGHOUT THE CUNTINENTAL UNITED STATES. FOWEVER, THE DCS PREBABLY WILL CONSIST OF ONLY A SMALL NUMBER OF INITIAL DOPAS, AND USER AGENCIES WILL BE ABLE TO PROCURE. INSTRUMENT, AND DEVELOP ADDITIONAL PLATFORMS ACCORDING TO THEIR NEEDS. DATA FRUM THIS EXPERIMENT WILL BE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT. ND.

ON 00/00/68, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- ESGEO ALTERNATE NAMES- GEOS. ESRO GEOS

ASSCC IC ESGEC

PLANNED LAUNCH DATE- 08/00/76 SP

SPACECRAFT WEIGHT IN CREIT- 260. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY
INTERNATIONAL

ESRO

PLANNED URBIT PARAMETERS

CRBIT TYPE- GEOCENTRIC ORBIT PERICE- 1440. NIN

APOAPS IS - 41878. KM ALT PERTAPSIS~ 41878. KM ALT INCLINATION-

1. DEG

SPACECRAFT PERSONNEL (PM =PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.E. MULLINGER
PS - K. KNOTT

ESRO ESRO

NOORDWIJK. THE NETHERLAND NECROBIJK. THE NETHERLANDS

SPACECRAFT ERIEF CESCRIPTION

THE ESRO SPACECRAFT GEDS IS DESIGNED TO MAKE INTEGRATED SCIENTIFIC STUDIES OF THERMAL PLASMA DISTRIBUTION. ENERGETIC PARTICLES (EXCLUDING GALACTIC COSMIC RAYS), FIELDS. AND WAVES. THE SPACECRAFT WILL BE PUT INTO A GEDSTATIONARY EQUATORIAL ORBIT AND WILL BE SPIN STABILIZED WITH ITS SPIN AXIS ORIENTED PERPENDICULAR TO THE ORBITAL PLANE. THE SPACECRAFT WILL BE ATTITUDE STABILIZED USING THREE-AXIS THRUSTERS WITH A HYDRAZINE PROPULSION SYSTEM. A LONGITUDINAL SHIFT MANEUVERING EETWEEN 15 DEG W AND 50 DEG E IS ANTICIPATED. THE PLANNED SPIN RATE OF THE SPACECRAFT WILL BE BETWEEN 10 AND 60 RPM. NORMALLY. THE SPACECRAFT WILL BE LCCATED SCMEWHERE EETWEEN THE PLASMAPAUSE AND THE INNER EDGE OF THE PLASMA SHEET. IT IS EXPECTED. HOWEVER.

THAT UNDER EXTREMELY QUIET CONDITIONS THE PLASMASPHERE WILL EXTEND BEYOND 6.6 RE. THERE WILL BE NO ONBOARD TAPE RECORDER. AND SOME EXPERIMENTS WILL REQUIRE ONLINE COMPUTER CONTROL.

ON 12/18/72. THE SPACECRAFT MISSIGN WAS APPROVED.

# EXPERIMENT NAME- ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION

NSSCC IC ESGEO -01

PI - G. OI - E. OI - B. OI - A.	PERSUNNEL PEOTZER KEPPLER WILKEN KORTH MUENCH	(PI=PRINCIPAL INVESTIGATOR, OI=C M.PLANCK INST.LINDAU M.PLANCK INST.LINDAU M.PLANCK INST.LINDAU M.PLANCK INST.LINDAU M.PLANCK INST.LINDAU	LINDAU. W. GERMANY LINCAU. W. GERMANY LINDAU. W. GERMANY
OI - J.	MUENCH	WALE WILLIAM	

# EXPERIMENT BRIEF CESCRIFT ION

THIS EXPERIMENT WILL STUDY THE ENERGY-DEPENDENT FITCH ANGLE DISTRIBUTION FOR ELECTRONS FROM 30 TO 200 KEV AND FOR PROTON FLUXES FROM 40 KEV TO 1.4 MEV IN TWO DIRECTIONS. THE EXPERIMENT WILL USE A MAGNETIC DEFLECTION SYSTEM AND TWO PARTICLE TELESCOPES. THE VIEWING ANGLE OF THE SYSTEM WILL BE 0 TO 120 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- THERMAL FLASMA FLOW

NSSEC IC ESGED -02

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EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
                               U COLLEGE + LONDON LONDON , ENGLANC
PI - R.L.F. BOYD
                                                      LCHCCH, ENGLAND
                               U COLLEGE. LENDEN
           NORMAN
01 - K.
                                                     LCHECK, ENGLAND
                               U COLLEGE . LENDEN
           RAITT
.L.W - 10
                                                     LONDON. ENGLAND
                               U COLLEGE. LONDON
01 - G.L.
          WRENN
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# EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROST AT IC ANALYZERS WILL BE USED TO STUDY THE THERMAL PLASMA AMBIENT IN THE REGION OF A GEOSTATIONARY CRBIT. MCUNTED ON AT LEAST A TWO-M BOOM, THE SENSORS WILL BE ORIENTED SO THAT ONE DETECTOR LOOKS PARALLEL TO THE SPACECRAFT SPIN AXIS AND CHE DETECTOR LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPRICATED.

EXPERIMENT NAME- LOW-ENERGY ION COMPOSITION

NSSDC ID ESGEO -03

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EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTFER INVESTIGATOR)
                                                     BERNE . SWITZERLAND
                               U OF BERNE
PI - J.
           GE ISS
                                                     BERNE . SWITZERLAND
                               U OF BERNE
           EBERHARIT
DI - P.X.
                               M.FLANCK INST.GARCHING GARCHING. W. GERMANY
           POSENBAUER
DI - H.R.
                                                     BERNE, SWITZERLAND
                               U OF BERNE
           BALSIGER
OI - H.
                                                     PERNE + SWITZERLAND
                               U OF BERNE
           HIRT
01 - P.
                                                     EERNE, SWITZERLAND
                               U CF BERNE
• A - IO
           CHICLMETTI
                                                     BERNE. SWITZERLAND
                               U OF BERNE
01 - H.
           LOIDE
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## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY ION COMPOSITION, ENERGY SPECTRA, AND THE ANGULAR DISTRIBUTION OF LOW-ENERGY PARTICLES USING AN ELECTROSTATIC ANALYZER FOLLOWED BY A COMBINED ELECTROSTATIC NAGNETIC ANALYZER. THE DETECTOR WILL BE LOCATED ON THE SATELLITE BODY, POINTED PERPENDICULAR TO THE SPIN AXIS, I.E., IN THE SPACECRAFT ORBITAL PLANE.

ON 12/18/72. THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ELECTRON AND PROTON PITCH NSSDC ID ESGEO -04
ANGLE DISTRIBUTION

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - B.K.G. HULTQUIST KIRUNA GEOPHYSICAL DES KIRUNA, SWEDEN

OI - L.A. HOLMGREEN KIRUNA GECPHYSICAL DES KIRUNA, SWEDEN

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE PITCH ANGLE DISTRIBUTION OF ELECTRONS AND PROTONS IN THE G.2+ TO 2C-KEV ENERGY RANGE USING 10 ELECTROSTATIC ANALYZERS. THE DETECTORS WILL BE LOCATED ON THE SPACECRAFT BODY AND WILL HAVE VIEWING ANGLES BETWEEN C AND 180 DEG RELATIVE TO THE SPIN AXIS. EMPHASIS WILL BE PUT ON ANGULAR RESOLUTION.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VLF FIELD ANTENNA

NSSEC IE ESGEG -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTFER INVESTIGATOR)
PI - M. PETIT CNET PARIS, FRANCE
GI - C. BEGFIN GRI DRLEANS, FRANCE

EXPERIMENT BRIEF CESCRIPTION

A 20-M BALANCED DIPOLE NORMAL TO THE SPACECRAFT SPIN AXIS WILL BE USED TO DETECT VLF PLASMA RESONANCES EXITED BY SIGNALS ENITTED FROM THE SAME ANTENNA. THE INSTRUMENT IS DESIGNED TO CAPACITIVELY COUPLE TO THE THERMAL PLASMA.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROMAGNETIC WAVE FIELDS

NSSDC ID ESGEC -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFEF INVESTIGATOR)
PI - R. GENDRIN CNET FARIS, FRANCE
OI - J.M. ETCHETO CNET FARIS, FRANCE
OI - E. UNGSTRUP DANISH INST SPACE RSCH LYNGBY, DENMARK

## EXPERIMENT BRIEF DESCRIPTION

DRITHOGENAL SHERT ELECTRIC DIPOLE AND MAGNETIC METAL CORE SEARCH COIL SYSTEMS, DESIGNED TO OBTAIN ELECTROSTATIC PLASMA WAVE MEASUREMENTS, WILL BE LOCATED ON THE TIPS OF FOUR BOOMS MOUNTED PARALLEL TO THE SATELLITE SPIN

AXIS. THE ELECTRIC ANTENNA SYSTEM WILL CPERATE BETWEEN 30 HZ AND 10 KHZ. AND THE MAGNETIC SYSTEM WILL OPERATE BETWEEN 0.1 HZ AND 3.5 KHZ.

ON 12/18/72, THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- DC FIELDS

NSSDC ID ESGED -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) EUR SPACE TECH CENTER NOURDWIJK. THE NETHERLANDS PETERSEN PI - A. EUR SPACE TECH CENTER NCCFDWIJK, THE NETHERLANDS JONES. 01 - D. EUR SPACE TECH CENTER NECEDWIJK. THE NETHERLANDS KNOTT 01 - K. EUR SPACE TECH CENTER NOORDWIJK. THE NETHERLANDS OI - R.J.L. GRAED

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL DESERVE DC ELF AND VLF FIELDS BY MEANS OF A RECEIVER/ANTENNA SYSTEM. THE ANTENNA WILL CONSIST OF A FAIR OF SPHERES MOUNTED ON THE ENDS OF A 20-M BOOM THAT WILL EXTEND IN OPPOSITE DIRECTIONS FROM THE SPACECRAFT. THE ANTENNA WILL BE PERPENDICULAR TO THE SPIN AXIS OF THE SPACECRAFT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DC ELECTRIC FIELD AND GRADIENT B NSSDC ID ESGEO -08 ELECTRON BEAM DEFLECTION

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=GTFER INVESTIGATOR) M.PLANCK INST. GARCHING GARCHING. W. GERMANY MELZNER P1 - F. M.PLANCK INST.GARCHING GARCHING. W. GERNANY VOLK 01 - H+ M.PLANCK INST. GARCHING GARCHING. W. GERMANY 01 - 6. METZNER

## EXPERIMENT ERIEF CESCRIPTION

ELECTION BEAMS EMITTED FROM BOCK-MOUNTED GUNS WILL BE DETECTED FROM THE MAIN SATELLITE TO DETERMINE, BY BEAM DEFLECTION, THE DC ELECTRIC FIELD AND GRADIENTS IN THE CC MAGNETIC FIELDS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETER

NSSCC IC ESCEO -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=(THER INVESTIGATOR) AGUILA: ITALY L OF AQUILA PI - F. MARIANI NATE RICH CHEL ITALY REME. ITALY CANDIDI 01 - M.

EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT WILL STUDY DC AND AND VLF MAGNETIC FIELDS USING A TRIAXIAL FLUXGATE MAGNETOMETER LOCATED AT THE END OF A 2-M BOOM.

UN 12/18/72, THE SPACECFAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME - EXCS-A
ALTERNATE NAMES - EXCSPHERIC SAIT A

NEEDC ID EXCS-A

PLANNED LAUNCH DATE- 00/00/77

SPACECRAFT WEIGHT IN GREIT-

75 . KC

LAUNCH SITE- KAGESFINA, JAPAN

LAUNCH VEFICLE- M-3S-H

FUNDING AGENCY

PAN TCKYO U

PLANNED ORGIT PARAMETERS

ORBIT TYPE- GEOCENTRIC APOAPS IS- 3000.00 KM ALT ORBIT PERIOD- MIN
PERIAPSIS- 250.000 KM ALT INCLINATION-

60. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - K. HIRAO UNIVERSITY OF TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF JAFAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETO SPHERIC STUDY. THE OBJECTIVE WILL BE TO STUDY THE POLAR AURORA AND IONOSPHERE. THE PAYLOAD WILL CONSIST OF AN AURORAL XUV TELEVISION CAMERA AND MASS SPECTROMETER DESIGNED TO STUDY THE ELECTRON AND ION DENSITY AND TEMPERATURE. THERE WILL ALSO BE ENERGETIC PARTICLE DETECTORS DESIGNED TO STUDY THE FLUX OF ELECTRONS IN THE IONOSPHERE.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - IONOSPHERIC PROBES

NSSCC IC EXUS-A -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF CESCRIPTION

IONOSPHERIC PROBES WILL OBSERVE ELECTRON DENSITY AND TEMPERATURE IN ADDITION TO ION CENSITY, COMPOSITION AND TEMPERATURE.

UN 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

MESDC ID EXCS-A -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE FLUX OF ELECTRONS AND PROTONS IN THE MAGNETOSPHERE, USING ENERGETIC PARTICLE DETECTORS, ESPECIALLY IN THE POLAR REGIONS.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- X-FAY AND ULTRAVIOLET AURGRAL TELESCOPES ASSOC ID EXCS-A -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTFEF INVESTIGATOR) UNKNOWN UNKNOWN P1 -

EXPERIMENT BRIEF DESCRIPTION

EXDS-A IS A JAPANESE SCIENTIFIC SATELLITE THAT WILL BE LAUNCHED DURING THE INTERNATIONAL MAGNETCEPHERIC STUCY. 1976-1978. THIS EXPERIMENT WILL CONTRIBUTE TO ONE OF THE SATELLITE'S OBJECTIVES OF EXPLORING THE POLAR IDNOSPHERE. BY MEASURING AURORAL EMISSIONS WITH X-RAY AND ULTRAVICLET AURCRAL TELESCOPES.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOMETER

NSSDC ID EXCS-A -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) UNKNOWN UNKNOWN

EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE EARTH'S MAGNETIC FIELD. ESPECIALLY OVER THE POLAR REGIONS. USING MAGNETOMETERS.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- EXOS-B FXTSPHERIC SAT B ALTERNATE NAMES-

NSSCC IC EXOS-B

SPACECRAFT WEIGHT IN CRBIT-PLANNED LAUNCH DATE- 00/00/78

LAUNCH SITE- KAGOSHIMA. JAPAN

LAUNCH VEHICLE- M-35-5

30. DEG

FUNDING AGENCY JAPAN

TOKYO U

PLANNED ORBIT PARAMETERS

ORBIT PERICC- 480. MIN ORBIT TYPE- GEGCENTRIC

INCLINATION-ECO. KM ALT PERIAPSIS-APDAPSIS- 30000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST) UNIVERSITY OF TOKYC TOKYC . JAPAN OBAYASHI PM - T.

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE SATELLITE WILL STUDY THE PLASMASPHERE UP TO CEOCENTRIC DISTANCES OF 30,000 KM. ITS PLASMA EXPERIMENTS WILL STUDY THE ELECTRON AND ION DENSITY AND TEMPERATURE. THE SPACECRAFT WILL CARRY ENERGETIC PARTICLE DETECTORS, TO STUDY THE ELECTFON AND PROTON FLUX IN THE ENERGY RANGE 10 TO 10,000 EV, AND ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOSPHERIC PLASMA PROBE

ANSSDC ID EXCS-8 -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL USE PLASMA PROBES TO MEASURE THE MAGNETOSPHERIC ELECTRON (AND ICN) DENSITY AND TEMPERATURE UP TO AN ALTITUDE OF 30,000 KM.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

NESCO ID EXCS-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTRON AND PROTON FLUXES IN THE MAGNETOSPHERE IN THE ENERGY RANGE 10 EV TO 10 KEV. ESPECIALLY IN THE PLASMASPHERE REGION.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS

NSSCC IC EXOS-8 -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTROMAGNETIC FIELD FLUCTUATIONS THROUGHOUT THE PLASMASPHERE.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOSPHERIC PLASMA

NSSCC IC EXCS-8 -04

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR)
PI - UNKNOWN UNKNOWN .

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE MAGNETOSPHERIC PLASMA TO OBTAIN ELECTRON AND ION CENSITIES AND TEMPERATURES THROUGHOUT THE FLASMASPHERE.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

SPACECRAFT COMMON NAME- EXOS-C

PLANNED LAUNCH DATE- 01/00/78

NESCC ID EXCS-C

EXDSPHERIC SAT C ALTERNATE NAMES-

> SPACECRAFT WEIGHT IN GREIT-100. KG

1 AUNCH SITE- KAGDSHINA. JAPAN

LAUNCH VEHICLE- M-4S-H

FUNDING AGENCY

JAFAN

TOKYD U

PLANNED ORBIT PARAMETERS

ORBIT PERIOD-MIN ORBIT TYPE- GECCENTRIC

PERIAPSIS- 500. KM ALT INCLINATION- 50. DEG 500 . KM ALT APDAPS IS -

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST) U CF TOKYC TOKYO. JAPAN ODA

SPACECRAFT BRIEF DESCRIPTION

THE PURPOSE OF THIS SPACECRAFT WILL BE TO MENITCE CHARGED PARTICLES AND X-RAY, GAMMA-RAY, UV, AND IR RADIATION FROM THE SUN AND GALAXIES. THE SPACECRAFT WILL BE PUT INTO A CIRCULAR CREIT OF 500-KM ALTITUDE AND WILL BE CAPABLE OF PRECISE ATTITUDE CONTROL. FIVE DETECTOR SYSTEMS VILL BE USED TO ATTAIN THE GOALS OF THIS MISSION -- X-RAY TELESCOPES, A GAMMA-RAY TELESCOPE, A UV TELESCOPE. AN IR TELESCOPE. AND ENERGETIC PARTICLE DETECTORS.

CN 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- X-RAY AND GAMMA- FAY ASTRONGMICAL TELESCOPES

NSSEC IE EXTS-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) UNKNEWN UNKNEWN PI -

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL COSERVE ASTRONOMICAL SCURCES WITH X-RAY AND GAMMA-RAY TELESCOPES.

ON 03/00/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET TELESCOPE

ASSEC ID EXGS-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTFEF INVESTIGATOR) UNKNEWN bī -UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE USED TO OBSERVE ASTRONOMICAL OBJECTS IN THE UV REGION OF THE SPECTRUM.

ON 03/00/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- INFRARED TELESCOPE

N\$SDC ID EXOS-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) UNKARWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION THIS EXPERIMENT WILL BE USED TO OBSERVE ASTRONOMICAL DEJECTS IN THE INFRARED REGION OF THE SPECTRUM.

CN 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLES

NSSCC IC EXOS-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTHER INVESTIGATOR) PI -UNKNOWN LNKNEWN

EXPERIMENT BRIEF CESCRIFTION THE PURPOSE OF THIS EXPERIMENT IS TO MEASURE ENERGETIC CHARGED PARTICLES OF BOTH SOLAR AND GALACTIC ORIGIN.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

SPACECRAFT COMMON NAME- GEOS-C ALTERNATE NAMES -

GEODETIC SATELLITE-C

NESDC ID GEDS-C

PLANNED LAUNCH DATE- 07/00/74 SPACECRAFT WEIGHT IN CREIT-

241.0 KG

LAUNCH SITE- VANCENEERS AFE. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NASA-CSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERICO- 103.5 MIN

APUAPS IS -964. KM ALT PERIAPSIS- 890. KM ALT INCLINATION-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=FRCJECT SCIENTIST)

PM - R.M. RADOS

NASA-GSFC

GREENBELT, MD

BERBERT PS - J.H.

NASA-GSEC

GREENEELT, NO

SPACECRAFT ERIEF CESCRIPTION

THE SPACECRAFT WILL CONSIST OF AN OCTAHEDRON. TOPPED BY A TRUNCATED PYRAMID. WITH A PARABOLIC REFLECTOR FOR A RADAR ALTIMETER ON THE FLAT BOTTOM

SIDE. A METAL RIESON BOCK WITH END MASS WILL EXTEND LEWARD AFFROXIMATELY 20 FT FROM THE TOP OF THE PYRAMIC. PASSIVE LASER RETROFLECTOR CUEES WILL BE MOUNTED IN A RING AROUND THE PARABOLIC REFLECTOR WITH THE NORMAL VECTOR FROM EACH CUBE FACE 45 DEG OUTWARD FROM THE EARTH DIRECTION OF THE BOOM AXIS. A TURNSTILE ANTENNA FOR VEF AND UFF FREQUENCIES AND SEFARATE ANTENNAS FOR EARTH-VIEWING 324-MHZ DOPPLER. C-BAND. AND S-BAND TRANSPONDERS WILL BE MOUNTED SEPARATELY ON FLAT SURFACES NEXT TO THE PARABOLIC REFLECTOR. THE DIMENSION ACROSS THE FLATS OF THE DOTAHEDRON WILL BE 48 IN. , AND THE SPACECRAFT WILL BE 43.79 IN. HIGH WITH A TOTAL WEIGHT OF 530 LBS. THE MISSION WILL PROVICE THE STEPPING STONE BETWEEN THE ENGLING NATIONAL GEDDET IC SATELLITE PROGRAM (NGSP) AND THE EMERGING EARTH AND CCEAN PHYSICS APPLICATION PROGRAM. IT WILL PROVIDE DATA WITH WHICH TO REFINE THE GEODETIC AND GEOPHYSICAL RESULTS OF THE NGSP AND WILL SERVE AS A TEST FOR NEW SYSTEMS. MISSION OBJECTIVES WILL BE TO PERFORM A SATELLITE ALTIMETRY EXPERIMENT IN CREIT. TO FURTHER SUPPORT THE CALIBRATION AND POSITION DETERMINATION OF NASA AND OTHER AGENCY C-BAND RADAR SYSTEMS. AND TO PERFORM A SATELLITE-TC-SATELLITE TRACKING EXPERIMENT WITH THE ATS-F SPACECRAFT USING AN S-BAND TRANSFONDER SYSTEM. THIS SYSTEM WILL ALSO BE USED FOR PERIODIC GEUS-C TELEMETRY DATA RELAY THROUGH ATS-F. TO FURTHER SUPPORT THE INTERCOMPARISON OF TRACKING SYSTEMS, TO INVESTIGATE THE SOLID-EARTH DYNAMIC PHENOMENA THROUGH PRECISION LASER TRACKING. TO FURTHER REFINE ORBIT DETERMINATION TECHNIQUES. THE DETERMINATION OF INTERDATUM TIES. AND GRAVITY MODELS. AND TO SUPPORT THE CALIBRATION AND POSITION DETERMINATION OF NASA-STON S-BAND TRACKING SYSTEMS.

/ / THE SPACECRAFT MISSICH WAS DN

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SPACECRAFT COMMON NAME - GOES-B ALTERNATE NAMES-

NESEC ID GCES-E

PLANNED LAUNCH DATE+ 07/00/75 SPACECRAFT WEIGHT IN DRBIT-

243. KG

0.0 DEG

LAUNCH SITE- CAPE KENNEDY. LNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

DEPTOFOUM

PLANNED DREIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIFO- 1640. MIN

APDAPSIS- 35700. KM ALT

PERIAPSISH 35700. KM ALT INCLINATION-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.V. FURCYCE NASA-GSEC

GREENEELT: ND

PS - W.E. SHENK NA SA - GSFC

GREENBELT. MD

SPACECRAFT GRIEF CESCRIFTION

GOES-E WILL HE A NASA-DEVELOPED. NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONCUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RACIOMETER (VISSR) TO FREVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METECROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY FROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EGUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED FARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT

MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SCLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN CLAM AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETEMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A FONEY COMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELSSCOPE WILL EF MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RACIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SCLAR PANELS. WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SCLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT, PROFER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS NOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-EAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHE TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS CREIT.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - VISIBLE-INFRARED SPIN-SCAN RADICMETER - NSSCC IC GCES-8 -01 (VISSR)

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, GIECTHER INVESTIGATOR)
PI - UNKNOWN NOAA-NESS SLITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRAFED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON GUES-E WILL BE CAPABLE OF PROVIDING BOTH DAY AND NIGHT EBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS. SPINHSTABILIZED. GEGSTATIONARY SATELLITE FOR USE IN OFERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PASTIAL PICTURES OF THE EARTH'S DISC. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMEN OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NEWINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS. WEICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL FROVICE A WEST-TO-EAST SCAN MOTICN WHEN THE SPIN AXIS OF THE SPACECRAFT IS GRIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN. EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMILM TELLURICE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERC NADIR ANGLE. THE INFRARED FORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A FROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSE CUTFLE WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA CEMMAND DATA ACCUISITION STATION, WALLERS ISLAND. VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER." WHERE IT WILL BE STURED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REEFCADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL TYPE DATA. THE VISSE DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE. NORTH CARCLINA. FOR ARCHIVING.

ON 05/00/73. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC 1D GCES-8 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR)
PI - D.J. WILLIAMS NGAA-ERL BOULDER, CO

EXPERIMENT ERISE DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILURED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCPIMINATION, WILL BE USED TO CETAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUPEMENTS -- SEVEN CHANNELS WILL MEASURE PROTUNS IN THE RANGE 1 TO 500 MEV. SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV. AND ENE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 05/00/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME+ SOLAR X-RAY MONITOR

NSSCC IC GCES-E -03

EXPERIMENT PERS MASEL (PI=PRINCIPAL INVESTIGATOR, C1=CT+ER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CC

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR. TWO IDNIZATION CHAMBERS. AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCEPE COLLIMATOR. WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCEPE ONCE CURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FUR DETECTION OF 1- TO 8-A X RAYS AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERE, AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE D.E-TO 3-A.

ON 06/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITUR

NESCC IC COES-B -04

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, OIECTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT ERIEF DESCRIPTION

A BIAXIAL. CLOSED-LOOP, FLUXGATE MAGNETCMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT HOOM (APPROXIMATELY 2 FT) ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SFIN AXIS AND THE CTHER PERPENCICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (50. 100. 200. OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFELIGHT CALIBRATION CAPABILITY.

UN CEZOOZTS, THE SPACECRAFT MISSICA WAS APPROVED.

EXPERIMENT NAME- METECROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NSSDC ID GCES-8 -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT ERIEF DESCRIPTION

THE METEORCHOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND > PROCESS METECROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-EASED DATA COLLECTION (CESERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL. GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10.000 DOP STATIONS CAN BE HANGLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF MARROW-BAND (WEFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL. GREUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METERADLOGICAL SATELLITE WILL CONSIST OF AFFROXIMATELY 3500 CCP STATIONS TO BE CONTACTED IN A 1-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HA PERIOD WILL BE BETWEEN BEDK AND ECCK BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING UNITHE TYPE AND VARIETY OF SENSERS USED AT AN INDIVIDUAL DOP STATICK.

UN 05/00/73, THE SPACECHAFT MISSION WAS APPROVED.

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SPACECRAFT CLAMEN NAME+ GLES+C ALTERNATE NAMES+

MESDC IC GCES-C

PLANNED LAUTCH CATE- 11/00/76

SPACECRAFT WEIGHT IN CREIT-

243 • KG

LAUNCH SITE- CARE KENNEDY, UNITED STATES

LAUNCH VEHICLE- DELTA

INCLINATION-

FUNDING AGENCY
UNITED STATES

DEPTOFCEM

PLANNED DREIT PARAMETERS

DRUIT TYPE- CECCENTRIC

OPBIT PERICO- 1460. MIA

APOAPS 15 - 35700 . KM ALT

PERIAPSISH BE700. KM ALT

0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)

PM - D.V. FORCYCE

NASA-GSFC

GREENBELT. MO

PS - W.E. SHEEK

NASA-GSEC

GREENBELT. NO

SPACECRAFT EFTER BESCRIFTION

- GOES-C WILL BE A NASA-DEVELOPED, NOAA-UPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO FROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE

EARTH/ATMOSPHERE SYSTEM+ (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED CATA FROM CENTRAL MEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLEGE AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS. AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SCLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAM AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE FRIMARY STRUCTURAL MEMBERS WILL BE A FONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RACIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE CUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR FANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT. BATTERIES. AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 SPM) WILL SE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LCW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE FRIMARY SUBSYSTEM CNCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS DRBIT.

ON 06/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=CTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

## EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON GDES-C WILL BE CAPABLE OF PROVIDING BOTH DAY AND NIGHT COSERVATIONS OF CLOUD COVER AND EARTH/OLDUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS. SPIN-STABILIZEC, GECSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR UPTICAL AXIS, WHICH WILL BE ALIGNED FARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCEMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 WIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESCLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESCLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES EETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSE OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NUAA COMMAND DATA ACQUISITION STATICA, WALLERS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER." WHERE IT WILL BE

STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REEROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NCAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

ON 06/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC IC GCES-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) PI - D.J. WILLIAMS NOAA-ERL BOULDER. CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLIC-STATE DETECTORS. EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV. SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV. AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC IC GDES-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI + D.J. WILLIAMS NOAA-ERL SCULDER, CO

EXPERIMENT ERIEF CESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMEERS, AND TWO ELECTROMETERS. A SMALL ANGLLAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES, AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5 TO 3-A.

ON 06/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MACNETIC FIELD MONITOR

NSSCC IC GDES-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) PI - D.J. WILLIAMS NOAA-ERL BOULDER. CO

EXPERIMENT ERIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MUNITOR: THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO CHE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOCM (APPROXIMATELY 2 FT) ONE SENSOR WILL

BE ALIGNED PARALLEL TO THE SPACECRAFT SFIN AXIS AND THE CTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE FANGE (50, 100, 200. OR 400 GAMMAS). AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS). AND AN INFLIGHT CALIBRATION CAPABILITY.

CN 06/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - METEUROLOGICAL DATA COLLECTION AND NSSCC 10 GDES-C -05
TRANSMISSION SYSTEM

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: 01=(THER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

### EXPERIMENT ERIEF CESCRIPTION

THE METEGROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEGROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (GBSERVATION) PLATFORMS (DCF). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF MARROW-BAND (WEFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL. GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE CN 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATICNS TO BE CONTACTED IN A 5-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 5-HR PERIOD WILL BE BETWEEN 350K AND 500K BITS, DEFENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIOUAL STATIONS WILL VARY FROM 50 TO 3000 BITS. DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIOUAL COP STATION.

CN 06/00/73, THE SPACECRAFT MISSICN WAS APPROVED.

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SPACECRAFT COMMON NAME- GP-A
ALTERNATE NAMES- GRAVITATIONAL REDSHIFT F. GRAVR-A. FELATIVITY

PLANNED LAUNCH CATE- 02/00/75 SPACECRAFT WEIGHT IN CRBIT- 70. KG

LAUNCH SITE- WALLOPS ISLAND. UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-CSSA

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FROJECT SCIENTIST)

PM - J.S. STONE NASA-MSFC HUNTSVILLE, AL

PS - R.F.C. VESSOT SAD CAMBRIDGE, MA

### SPACECRAFT ERIEF DESCRIPTION

THIS SPACECRAFT WILL CARRY ONE EXPERIMENT ON A FLIGHT OF ABOUT 3.5 HR TO AN ALTITUDE NEAR 18,530 KM. THE SPACECRAFT WILL WEIGH ABOUT 60 KG. UPON COMPLETION OF THE FLIGHT, THE SPACECRAFT SHOULD IMPACT IN THE ATLANTIC OCEAN

NEAR BERMUDA. THE SPACECRAFT WILL BE PROVIDED WITH CONTINUOUS TRACKING AND TELEMETRY FROM WALLOPS ISLAND AND BERMUDA. IT IS FLANNED TO STUDY GRAVITATIONAL EFFECT ON TIME MEASUREMENTS (RELATIVISTIC OR EINSTEIN REDSHIFT) BY USE OF A HYDROGEN MASER OSCILLATOR SYSTEM (CLCCK). THIS IS TO VERIFY ONE OF THE RESULTS EXPECTED FROM EINSTEIN'S GENERAL THEORY OF RELATIVITY. THE SPACECRAFT SUPPORT EXPERIMENT WILL CONSIST OF AN S-BAND TELEMETRY TRANSPONDER, A BATTERY, AND A COOLING SYSTEM.

ON 08/00/73, THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- GRAVITATIONAL POTENTIAL AS A FUNCTION NSSDC ID GRAVE-A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=CTHER INVESTIGATOR)
PI - R.F.C. VESSOT SAO CAMERIDGE, MA
OI - M.W. LEVINE SAO CAMBRIDGE, MA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO STUDY THE RELATION BETWEEN TIME PASSAGE AND GRAVITATIONAL POTENTIAL. ACCORDING TO THE EINSTEIN GENERAL THEORY, TIME (FREQUENCY OF AN OSCILLATOR) PASSES SLOWER IN A STRING GRAVITATIONAL FIELD, THAN IN A WEAKER FIELD (FREQUENCY SHIFT TOWARD THE RED. OR SLOWER FREQUENCY. END OF THE VISIBLE SPECTRUM). FREQUENCY COMPARISONS OF EQUIVALENT HYDROGEN MASER OSCILLATORS ON THE SPACECRAFT AND ON THE EARTH SHOULD PROVIDE OBSERVATIONAL SUPPORT OF THIS EFFECT. RELATIVISTIC FREQUENCY SHIFTS ARE EXPECTED TO OCCUR AS A RESULT OF BOTH VEHICLE VELCCITY AND CHANGE IN GRAVITATIONAL POTENTIAL. TWO SEPARATE SYSTEMS WILL BE USED TO MEASURE THESE SHIFTS. ONE SYSTEM WILL MEASURE THE ELAPSED FHASE CHANGES IN THE TRANSMISSION PATH, THE OTHER WILL MEASURE THE PHASE OF THE SPACECRAFT OSCILLATOR AS RECEIVED VIA THE TRANSMISSION PATH AND COMPARED TO THE EARTH-BASED OSCILLATOR. PHASE CHANGES IN THE TRANSMISSION FATH DUE TO ATMOSPHERIC EFFECTS, IGNOSPHERIC EFFECTS, AND RANGE VARIATION WILL BE AUTOMATICALLY AND COHERENTLY CORRECTED.

ON OB/00/73, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME - HAWKEYE NSSDC ID HAWKEYE ALTERNATE NAMES - INJUN-F. NEUTRAL PCINT EXPLORER, INJUN 6

PLANNED LAUNCH DATE- 11/00/74 SPACECRAFT WEIGHT IN CREIT- 27.2 KG

LAUNCH SITE- VANCENBERG AFE, UNITED STATES . LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-055

UNITED STATES NASA-CSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC DRBIT PERIOD- 1920. NIN

APOAPSIS- 89222.0 KM ALT PERIAPSIS- 200.000 KM ALT INCLINATION- 90. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

ROGERS PM - J. PS - J.A. VAN ALLEN บ อF 10 WA U CF IDWA

IOWA CITY, IA ICHA CITY. IA

# SPACECRAFT ERIEF CESCRIPTION

HAWKEYE WILL BE PART OF THE U.S. CONTRIBUTION TO THE INTERNATIONAL MAGNET OSPHERIC STUDY. IT WILL STUDY THE NEUTRAL POINT REGION OF THE MAGNETOSPHERE. THE EXPERIMENTS WILL INCLUDE PARTICLE AND FIELD OBSERVATIONS AND LOW-ENERGY PLASMA STUDIES RELEVANT TO THE DYNAMICS OF SCLAR WIND INJECTION INTO THE MAGNETOSPHERE.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETCHETER

NESDO ID HAWKEYE-OL

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) IOWA CITY, IA U DE IOWA VAN ALLEN PI - J.A. ICWA CITY. 1A L CF IOWA DI - M.N. OLIVEN

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A TRIAXIAL FLUXGATE MAGNET CMETER CAPABLE OF OPERATION AT TWO LEVELS. LOW GAIN AND HIGH GAIN. IN THE HIGH-GAIN MODE THE MAGNETEMETER RANGE IS FROM ABOUT 0.1 TO 100 GAMMA (STRAY SATELLITE MAGNETIC FIELDS ARE TO BE CONSTRAINED TO LESS THAN C.1 GAMMA). IN THE LOW-GAIN MODE THE MAGNETOMETER RANGE IS FROM 100 TO ABOUT 1000 GAMMA. THE EXPERIMENT WILL SURVEY THE MAGNETIC FIELDS IN THE MAGNETOSPHERE. ESPECIALLY NEAR THE POLAR CUSPS.

DN 12/18/72. THE SPACECRAFT MISSION WAS AFFREVED.

EXPERIMENT NAME- LOW-ENERGY PROTONS AND ELECTRONS

NESCO ID HAWKE YE-02

EXPERIMENT PERS. MNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) U OF IOWA ICWA CITY. IA FRANK PI - L+A+ IOWA CITY. IA U OF TOWA C1 - J.D. CRAV EN

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF ONE LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA) ORIENTED FERFENCICULAR TO THE SATELLITE SPIN AXIS. THE LEPECEA WILL MEASURE PROTONS AND ELECTRONS IN 16 CHANNELS OVER AN ENERGY RANGE OF 50 EV TO 50 KEV. THE EXPERIMENT WILL SURVEY THE PARTICLE ENVIRONMENT OF THE MAGNETOSPHERE. ESPECIALLY NEAR THE POLAR CUSPS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELF/VLF RECEIVERS

NESDC ID HAWKEYE-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=CTFER INVESTIGATOR) U CF ICWA IDWA CITY, IA PI - D. A. GURNETT

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO DETECTORS -- (1) A 15-CHANNEL SPECTRUM ANALYZER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 178 KHZ WITH LOGARITHMIC SPACING AND (2) A WIDE-BAND RECEIVER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 10 KHZ. THE SIGNALS FROM THE FIRST DETECTOR WILL BE SENT TO GROUND STATIONS DIRECTLY IN DIGITAL FORM, WHEREAS THE OUTPUT FROM THE SECOND DETECTOR WILL BE TRANSMITTED TO GROUND STATIONS IN ANALOG FORM. BOTH DETECTORS CAN BE USED IN CONNECTION WITH EITHER OF TWO ANTENNAS -- AN ELECTRIC DIPOLE ABOUT 42 METERS IN LENGTH FROM TIF TO TIP AND A SEARCH COIL ANTENNA, THE EXPERIMENT WILL MEASURE PLASMA WAVES IN THE MAGNETCSPHERE ESPECIALLY NEAR THE POLAR CUSPS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT CEMMON NAME- HELIDS-A ALTERNATE NAMES-HELIO-A, PL-741A

NESDC ID HELIC-A

PLANNED LAUNCH CATE- 08/00/74

SPACECRAFT WEIGHT IN DRBIT-

210. KG

O. DEG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- TITAK-CENT

FUNDING AGENCY

FED. REP. OF GERMANY

PLANNED ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC

ORBIT PERICO- 192. DAYS

AU RAE

PER IAPSIS-C.3 AL RAD

INCLINATION-

PM - A.

SPACECRAFT PERSONNEL (PM=PROJECT MANAGÉR, PS=PROJECT SCIENTIST)

KUTZER

GSCHAFT FUR WELTFORSCH BCNA, N. GERMANY

PM - G:# . DUSLEY PS - H. PORS CHE

NA SA – G SEC GREENBELT, MD

PS - J.H.

MAX PLANCK INST

W. GERMANY

TRAINGR

NASA-GSEC

GREENEELT. NO

# SPACECRAFT ERIEF CESCRIPTION

THE HELIGS A SPACECRAFT IS DESIGNED AS A SCLAF FROEE TO CARRY SCIENTIFIC EXPERIMENTS ON AN INTERPLANETARY MISSION APPROACHING TO ABOUT 0.3 AU OF THE SUN. THE EXPERIMENTS WILL BE PROVIDED BY A GROUP OF GERMAN AND AMERICAN SCIENTISTS. WITH NASA SUPPLYING THE ATLAS CENTAUR LAUNCH VEHICLE AND WEST GERMANY SUPPLYING THE SPACECRAFT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME+ FLUXGATE NAGNETONETER FOR FIELD FLUCTUATIONS

ASSCC IC HELIG-A-01

EXPERIMENT PERSONNEL (PI \*PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR)

PI - F.M. NEUBAUER ERAUNSCHWEIG TECH U

BRAUNSCHWEIG . W. GERMANY

•A - 10 MAIER

BRAUNSCHWEIG TECH U

ERPUNSCHWEIG. W. CERMANY

EXPERIMENT ERIEF DESCRIPTION

A TRIAXIAL FLUXCATE MAGNETOMETER WILL MEASURE VECTOR COMPONENTS OF THE MAGNETIC FIELD WITH MAGNITUDE UP TO 102.4 GAMMAS (RESOLUTION 0.4 GAMMA) AND WITH MAGNITUDES UP TO 409.6 GAMMAS (RESOLUTION. 1.2 GAMMA). ONE VECTOR MEASUREMENT PER 2 SEC WILL BE OBTAINED IN THE NORMAL MODE. EIGHT MEASUREMENTS PER SEC WILL BE OBTAINED IN THE SHOCK MODE TO BE USED FOR INTERVALS OF ABOUT 3 MIN. THUS. THE QUASI-STATIC COMPONENT AND FLUCTUATING COMPONENTS OF THE INTERPLANETARY MAGNETIC FIELD WILL BE STUCIEC.

ON 12/16/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS NSSDC 10 HELID-A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) GREENEELT. MD NASA-GSFC MESS PI - N.F. AGLILA. ITALY U CF AGUILA MARIANI 01 - F. GREENEELT. MC NASA-GSFC 01 - L.F. BURL, AGA ROME. ITALY U OF ROME CANTARAND 01 - S.C.

## EXPERIMENT PRIEF DESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE INTERPLANETARY MAGNETIC FIELD DIRECTIONS AND MAGNITUDES IN THE FOLLOWING THREE RANGES (AND ACCURACIES) -- 25 GAMMAS (0.1 GAMMA), 75 GAMMAS (0.3 GANNA), 225 GAMMAS (0.9 GAMMA). AT LOW TELEMETRY BIT RATES. AVERAGES AND VARIANCES WILL BE COMPUTED ONECARD FOR TRANSMISSION TO EARTH.

ON 12/18/72. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME - SEARCH COIL MAGNETOMETER

NSSDC ID HELID-A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) 01=0THER INVESTIGATOR) BRAUNSCHWEIG TECH L BRAUNSCHWEIG. W. GERMANY NEUBAUER PI → F - M -BRALNSCHWELG, W. GERMANY BRAUNSCHWEIG TECH U DEHMEL 01 - G.

## EXPERIMENT BRIEF DESCRIFTION

MAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE 5 HZ TO 3 KHZ WILL BE MEASURED BY A TRIAXIAL SEARCH-COIL MAGNETCHETER. FOR THE AXIS PARALLEL TO THE SPACEGRAFT SPIN AXIS. SPECTFAL RESCLUTION WILL BE CETAINED. BECAUSE OF THE LEW DATA RATE AVAILABLE. SHERT-TERM HIGH-RESCLUTION DATA ON EVENTS (SHOCKS) WILL BE ACCOMPLISHED USING ONECARD DATA STORAGE.

UN 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - COARSE FREQUENCY. FINE TIME RESOLUTION - NESDC ID HELIG-A-04 SPECTRUM ANALYSIS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTFER INVESTIGATOR) ICHA CITY, IA CF IOWA PI - D.A. CURNETT MINNEAPCLIS. MN U OF MINNESCTA 01 - P.S. KELLOGG FLAGSTAFF . AZ NA SA + GSFC DI - 5.J. BAUER GREENEELT. MD NASA-GSFC STONE 01 - R.G.

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO DESERVE ELECTROSTACTIC AND ELECTROMAGNETIC WAVE PHENOMA GVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXFERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TG-TIP LENGTH OF LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-A-04. HELIO-A-05. AND HELIO-A-06) WILL BE USED. THE ANALYZER IN EXPERIMENT HELIO-A-06 WILL BE A 16-CHANNEL SPECTRUM ANALYZER FOR COARSE FREQUENCY RESOLUTION (30 PERCENT) AND HIGH TIME RESOLUTION (.LT. 1 SEC) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ. (10WA)

ON 12/18/72, THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME - FINE FREQUENCY. COARSE TIME RESOLUTION - NSSDC ID HELIG-A-05 SPECTRUM ANALYSIS

EXPERIMENT	PERSCHNEL	(PI=PRINCIPAL INVESTIGATOR.	GI=CTHER INVESTIGATOR)
PI - C.A.	GURNETT	U OF IOWA	ISWA CITY: IA
ü <b>l -</b> P.S.	KELLOGG	U OF MINNESCIA	WINNEAPCLIS, WN
DI - 5.J.	BAUER	NA SA – G SFC	FLAGSTAFF, AZ
01 - R.G.	STONE	NASA-GSFC	GREENBELT. MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA EVER THE FREQUENCY RANGE FROM 10 H2 TC 2 MH2 IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JCINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-A-04, HELIO-A-05, AND HELIO-A-05). THE ANALYZER FOR HELIO-A-05 WILL BE A NARROW-BAND SWEEP FREQUENCY SPECTRUM ANALYZER FOR FINE FREQUENCY FESCULTION (4 PERCENT) AND LOW TIME RESOLUTION (LESS THAN 1 MIN) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ. (MINNESCTA)

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOKEZ-EMEZ RADIO WAVE

NESDC ID HELIC-A-06

EXPERIMENT	PERSONNEL	.(PI=PRINCIPAL INVESTIGATOR)	CIRDTHER INVESTIGATOR)
PI - U.A.	CURNETT	U CF IONA	ICWA CITY. IA
.01 - P.S.	KELLOGG	U OF MINNESCTA	MINNEAPOLIS, MN
01 - S.J.	BAUER	NA SA - GS F C	FLAGSTAFF. AZ
01 - R.G.	STONE	NA SA - GSFC	GREENEELT. NO

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A DUAL STEP-FREQUENCY RADIOMETER (5 KHZ BANDWIDTH). OPERATING BETWEEN 50 KHZ AND 2 MHZ IN A VARIABLE NUMBER OF STEPS. THE RADIOMETER WILL BE COUPLED TO A DIPOLE ANTENNA SHARED WITH TWO OTHER SPECTHUM ANALYZERS. WHICH WILL COVER THE 10 HZ TO 100 KHZ SPECTRAL RANGE. THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY TYPE III SOLAR RADIO BURSTS.

ON 12/18/72. THE SPACECRAFT MISSICH WAS APPROVED.

### EXPERIMENT NAME- COSMIC-RAY PARTICLES

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - Ge	WIBBERENZ	u of kiel	KIEL, W. GERMANY
DI - G.	GREEN	U OF KIEL	KIEL: WEST GERMANY
GI - Re	MUELLER	u of kiel	KIEL, WEST GERMANY
CI - M.	ITTE	U OF KIEL	KIEL, WEST GERMANY
DI A M.	KHNOM	U OF KIEL	KIEL WEST GERMANY

#### EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT, IDENTICAL TO ONE PROPOSED FOR HELIOS-8, WILL EE TO GATHER INFORMATION ABOUT (1) PARTICLE FLOW, ENERGY. AND DIRECTION AS A FUNCTION OF DISTANCE FROM THE SUN, AND (2) GALACTIC COSMIC RAYS, E.G., TO MEASURE SOLAR PARTICLES CLOSE TO THE SUN. TO STUDY THE PRUPAGATION CHARACTERISTICS OF SOLAR PECTONS. ALPHA FAFTICLES. AND ELECTRONS. TO MEASURE THE SPATIAL GRADIEN? AND CHARGE SPECTRUM OF GALACTIC COSMIC RAYS, ETC. THE DETECTOR TO BE USED WILL CONSIST OF A SEMICONDUCTOR COUNTER. A CSI (TL) SCINTILLATOR, AND A QUARTZ CEFENKOV COUNTER ENCLOSED BY AN ANTICOINCIDENCE CYLINDER, AND WILL BE CAPABLE OF DETECTING PARTICLES FROM 1 TO 1000 MEV/NUCLEON. THE MEASUREMENTS WILL BE CORRELATED WITH OTHER DNBUARD EXPERIMENTAL RESULTS AND WITH CATA FROM SATELLITES IN EARTH ORBIT.

ON \$2/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - GALACTIC AND SOLAR COSMIC RAYS NSSDC ID HELIO-A-08

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, CI=	CTHER INVESTIGATOR)
PI - J.H.	TRAINOR	NASA-GSFC	GREENEELT. MD
01 - E.C.	ROELOF	U OF NEW HAMPSHIRE	CURFAM. NH
01 - B.J.	TEEGARDEN	NA SA – GSFC	GREENEELT. MO
01 - F.8.	MCDONALD	NASA-GSFC	GREENEELT. MO
01 - K.G.	MCCRACKEN	U OF ADELAIDE	ACELAICE. AUSTRALIA

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PARTICLE TELESCOPES DESIGNED TO MEASURE THE ENTIRE ENERGY RANGE OF 0.1 TO ABOUT 800 MEV FOR PROTONS AND HEAVIER PARTICLES (Z LESS THAN 10) AND OF 0.05 TO S MEV FOR ELECTRONS. ENERGY SPECTRA, AND CHEMICAL AND ISOTOPIC COMPOSITION OF GALACTIC AND SCLAR COSMIC RAYS WILL BE STUDIED. ACCITIONALLY. AN X-RAY COUNTER WILL MONITOR THE SOLAR X-RAY EMISSION. THE THREE TELESCOPES WILL BE CONSTRUCTED FROM SULID-STATE CETECTORS. THE TELESCOPES AND THE X-RAY COUNTER WILL LOCK INTO THE ECLIPTIC PLANE.

UN 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PLASMA DETECTORS

NSSCC ID FELIC-A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, UI=CTFER INVESTIGATOR) PI - H.R. ROSENBAUER M.PLANCK INST.GARCHING GARCHING. W. GERMANY OI - H. PELLKOFER
OI - J.H. WOLFE

M.PLANCK INST.GARCHING GARCHING. W.GERMANY
NASA-ARC MOFFETT FIELD. CA

#### EXPERIMENT BRIEF CESCRIPTION

THESE DETECTORS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF THE PROTONS. ALPHA PARTICLES, AND ELECTRONS IN THE SOLAR WIND. A QUADRISPHERICAL ANALYZER WITH AN ENERGY PER CHARGE RANGE OF 231 V TO 16 KV. AN ANGULAR RESOLUTION OF 5 DEG IN AZIMUTH AND 5 DEG IN ELEVATION, AND A TIME RESOLUTION OF 30 SEC WILL BE USED TO OBSERVE PROTONS AND ALPHA PARTICLES. A HEMISPHERICAL ANALYZER WILL ALSO BE USED TO DETECT FROTONS AND ALPHA PARTICLES. ANOTHER HEMISPHERICAL ANALYZER WITH 10 ENERGY/CHARGE STEPS BETWEEN 15 V AND 1 KV. WILL BE USED TO OBSERVE ELECTRONS. MEASUREMENTS WILL BE MADE IN EIGHT EQUAL AZIMUTHAL SECTORS (45 DEG). THE INTEGRATION ANGLE IN ELEVATION WILL BE AEOUT 100 DEG.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - ENERGETIC ELECTRON DETECTOR

NESDC ID HELIG-A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHEF INVESTIGATOR)
PI = E. KEPPLER M.PLANCK INST.LINDAU LINDAU. W. GERMANY
OI = 8. WILKEN M.PLANCK INST.LINDAU LINDAU. W. GERMANY
OI = D.J. WILLIAMS NOAA-ERL BOULDER. CO

### EXPERIMENT BRIEF DESCRIPTION

ELECTRONS WITH ENERGIES BETWEEN 40 KEV AND 1 MEV WILL BE ENERGY-SELECTED BY TWO PERMANENT MAGNETS AND COUNTED BY SEMICONDUCTOR DETECTORS. PROTONS WILL BE DEFLECTED AND COUNTED SEFARATELY. THE POINTING DIRECTION WILL BE WITHIN THE ECLIPTIC PLANE WITH AN AFERTURE ANGLE OF ABOUT 20 DEG. THE TIME RESOLUTION WILL BE ON THE CROER OF MINUTES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ZODIACAL LIGHT PHOTOMETER

NSSCC IC HELIO-A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - C. LEINERT LAND GBS HEIDELBERG, W. GERMANY

GI - E. PITZ LAND GBS HEIDELBERG, W. GERMANY

#### EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PHOTOMETERS LOOKING AT 15 DEG. 30 DEG, AND 90 DEG FROM THE ECLIPTIC. THESE PHOTOMETERS WILL OBSERVE THE INTENSITY AND POLARIZATION OF THE ZODIACAL LIGHT IN UV. BLUE, AND VISUAL BANDS. THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN INFORMATION ABOUT THE SPATIAL DISTRIBUTION, SIZE, AND NATURE OF INTERPLANETARY DUST PARTICLES.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MICROMETEOROID DETECTOR AND ANALYZER NSSDC ID HELIG-A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=GTHER INVESTIGATOR)

PI - H. FECHTIG M.PLANCK INST. HEIDELEG HEIDELBERG, WEST GERMANY

DI - J. WEIFRAUCH M.PLANCK INST. HEIDELBE HEIDELBERG, W. GERMANY

#### EXPERIMENT BRIEF DESCRIPTION

THE AIM OF THE EXPERIMENT WILL BE TO INVESTIGATE SOME THEORIES ABOUT THE INTERPLANETARY CUST INCLUDING WHETHER -- (1) THE NUMBER OF PARTICLES INCREASES TOWARD THE SUN. (2) THE CUT-OFF FOR SMALL PARTICLES IS DEPENDENT ON THE DISTANCE FROM THE SUN BECAUSE SOLAR PRESSURE INCREASES NEARER THE SUN, AND (3) THE NUMBER DENSITIES OF PARTICLES CHANGE MEAR THE ORBITS OF PLANETS. THE KINETIC ENERGY OF DUST PARTICLES HITTING A TARGET WITH FIGH VELOCITY (SEVERAL KM/SEC) WILL CAUSE THE MATERIAL TO VAPORIZE AND BECCME PARTIALLY IONIZED. THE GENERATED PLASMA CLCUD CAN THEN SE SEPARATED BY APPROPRIATE VOLTAGES INTO ITS NEGATIVE (ELECTRON) FART AND INTO POSITIVE IONS. THE MASS AND THE ENERGY OF THE DUST PARTICLES WILL BE DETERMINED FROM THE IMPULSE HEIGHTS. A TIME-OF-FLIGHT MASS SPECTRONETER IN CONNECTION WITH THE TARGET WILL ALLOW THE SMALL ION CLOUD TO BE ANALYZED. IN THIS WAY THE INVESTIGATION OF THE CHEMICAL COMPOSITION OF THE CLST PARTICLES WILL BECOME POSSIBLE. THE THRESHOLD FOR THE DETECTION OF A PARTICLE WILL BE ABOUT 10 TO THE MINUS 15 GM. MASS AND ENERGY DETERMINATION WILL BE POSSIBLE FOR PARTICLES LARGER THAN ABOUT 10 TO THE MINUS 14 GM. FOR PARTICLES LARGER THAN 10 TO THE MINUS 13 GM. A MASS SPECTRUM MAY BE GATHERED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT CCMMCN NAME+ HELIOS-8
ALTERNATE NAMES- HELIO-8, PL-751A

NSSEC ID HELIC-B

PLANNED LAUNCH DATE- 11/00/76 SPACECRAFT WEIGHT IN ORBIT- 210. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
FED. REP. OF GERMANY

PLANNED ORBIT PARAMETERS

ORBIT TYPE- HEL INCENTRIC ORBIT PERIOD- 192. DAYS

APDAPSIS- AU RAC PERIAPSIS- C.3 AL RAD INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - A. KUTZER GSCHAFT FUR WELTFORSCH BCNN, W. GERMANY
PM - G.W. CUSLEY NASA-GSFC GREENBELT, MD
PS - H. PORSCHE MAX PLANCK INST W. GERMANY
PS - J.H. TRAINOR NASA-GSFC GREENEELT. MD

### SPACECRAFT BRIEF DESCRIPTION

THE HELIOS-8 SPACECRAFT IS DESIGNED AS A SULAR FROSE TO CARRY SCIENTIFIC EXPERIMENTS ON AN INTERPLANETARY MISSION APPROACHING TO ABOUT 0.3 AU OF THE SUN. THE EXPERIMENTS WILL BE PROVIDED BY A GROUF OF GERMAN AND U.S. SCIENTISTS, WITH NASA SUPPLYING THE ATLAS CENTAUR LAUNCH VEHICLE AND WEST GERMANY SUPPLYING THE SPACECRAFT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS

NSSCC IC HELIC-8-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - F.M. NEUBAUER BRAUNSCHWEIG TECH U BRAUNSCHWEIG. W. GERMANY OI ~ A. MATER BRAUNSCHWEIG TECH U ERAUNSCHWEIG, W. GERMANY

## EXPERIMENT ERIEF CESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE VECTOR COMPONENTS OF THE MAGNETIC FIELD WITH MAGNITUDE UP TO 102.4 GAMMAS (RESOLUTION 0.4 GAMMA) AND WITH MAGNITUDES UP TO 409.6 GAMMAS (RESOLUTION. 1.2 GAMMA). ONE VECTOR MEASUREMENT PER 2 SEC WILL BE OBTAINED IN THE NORMAL MODE. EIGHT MEASUREMENTS PER SEC WILL BE OBTAINED IN THE SHOCK MODE TO BE USED FOR INTERVALS OF ABOUT 3 MIN. THUS. THE QUASI-STATIC COMPONENT AND FLUCTUATING COMPONENTS OF THE INTERPLANETARY MAGNETIC FIELD WILL BE STUDIED.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS NSSDC ID HELIO-8-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) PI - N.F. NESS NASA-GSFC GREENEELT. MD 01 - F. MARIANI U OF AQUILA AQLILA. ITALY 01 - L.F. BURLAGA NASA-GSEC GREENEELT: MD OI - S.C. CANTARANII U OF ROME ROME, ITALY

## EXPERIMENT BRIEF DESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE INTERPLANETARY MAGNETIC FIELD DIRECTIONS. AND MAGNITUDES IN THE FOLLOWING THREE RANGES (AND ACCURACIES) -- 25 GAMMAS (0.1 GAMMA), 75 GAMMAS (0.3 GAMMA), 225 GAMMAS (0.9 GAMMA). AT LOW TELEMETRY BIT RATES. AVERAGES AND VARIANCES WILL BE COMPUTED ONSCARC FOR TRANSMISSION TO EARTH.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER

NSSDC ID HELID-8-03

EXPERIMENT PERSONNEL (PISPRINCIPAL INVESTIGATOR, OISOTHER INVESTIGATOR) PI - F.M. NEUBAUER BRAUNSCHWEIG TECH L BRAUNSCHWEIG. W. GERMANY 01 - G. DEHMEL BRAUNSCHWEIG TECH U BRAUNSCHWEIG. W. GERMANY

### EXPERIMENT BRIEF DESCRIPTION

MAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE 5 HZ TO 3 KHZ WILL BE MEASURED BY A TRIAXIAL SEARCH-COIL MAGNETCHETER. FOR THE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS. SPECTFAL RESCLUTION WILL BE DETAINED. BECAUSE OF THE LCW DATA RATE AVAILABLE, SHORT-TERM HIGH-RESCLUTION DATA ON EVENTS "(SHOCKS) WILL BE OBTAINED USING ONBOARD DATA STORAGE.

ON 12/18/72, THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- COARSE FREQUENCY, FINE TIME RESOLUTION NSSDC 10 HELIO-8-04 SPECTRUM ANALYSIS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) ICHA CITY. IA U CF IOWA GURMETT PI - D.A. MINNEAFELIS. MN U OF MINNESOTA KELLOGG OI - P.S. FLAGSTAFF, AZ NASA-GSFC BAUER üI - 5.J. GREENEELT. PC NASA-GSEC OI - P.G. STONE

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENDMENA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TC-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT CIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIC-8-04, FELIO-8-05, AND HEL 10-8-06). THE ANALYZER IN EXPERIMENT HELIC-8-04 WILL BE A 16-CHANNEL SPECTRUM ANALYZER FOR COARSE FREQUENCY RESOLUTION (30 PERCENT) AND HIGH TIME RESCLUTION (.LT. 1 SECOND) OVER THE FREGLENCY RANGE FROM 10 KZ TO 100 KHZ. (IDWA)

ON 12/18/72. THE SPACECHAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FINE FREGUENCY. COARSE TIME RESCLUTION - NSSCC IC HELIO-8-05 SPECTRUM ANALYSIS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) CI=CTHER INVESTIGATOR) IIIWA CITY, IA U OF IOWA PI - D.A. GURNETT MINNEAFCLIS. MN U OF WINNESCTA OI - P.S. KELLOGG FLAGSTAFF, AZ NA SA - GSFC BAUER 01 - 5.J. GREENBELT . MD NASA-GSEC STONE DI - RaGe

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA CVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE EETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TU-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT CLAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-B-C4. HELIC-B-05. AND HELIO-6-05). THE ANALYZER FOR HELIO-8-05 WILL BE A NARROW-BAND SWEEP FREQUENCY SPECTRUM ANALYZER FOR FINE FREQUENCY RESCLUTION (4 PERCENT) AND LCW TIME RESOLUTION (ABOUT 1 MINUTE) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ. (MINNESUTA)

ON 12/1d/72. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- SOKEZ-EMHZ RADIO WAVE

NESDC ID HELIC-B-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR» CI=OTHER INVESTIGATOR) ICWA CITY. IA U CF IOWA PI - D.A. GUP NE T T MINNEAPOLIS: MN U OF MINNESCTA DI - P.S. KELLINGG FLAGSTAFF + AZ NASA-GSEC 01 - S.J. BAUER GREENEELT . NO NASA-GSFC C1 - K.G. STONE

## EXPERIMENT ERIEF DESCRIFTION

THE EXPERIMENT WILL CONSIST OF A CUAL STEF-FREQUENCY RACIOMETER (5 KHZ BANDWIDTH). OPERATING BETWEEN 50 KHZ AND 2 MHZ IN A VARIABLE NUMBER OF STEPS. THE FACIOMETER WILL BE COUPLED TO A DIPOLE ANTENNA SHARED WITH TWO OTHER SPECTRUM ANALYZERS WHICH WILL COVER THE 10-HZ TO 100-KHZ SPECTRAL RANGE. THE PURPOSE OF THE EXPERIMENT WILL BE TO STUDY TYPE III SOLAR RADIO BURSTS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COSMIC-RAY PARTICLES

NESDC ID HELIC-B-07

EXPERIMENT PERSONNEL . (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) WIBBERENZ L OF KIEL 01 - G. KIEL, W. GERMANY GREEN U OF KIEL KIEL. WEST GERMANY OI - R. MUELLER U OF KIEL KIEL, WEST GERNANY ·OI - M. ITTE U OF KIEL KIEL, WEST GERMANY

### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT. IDENTICAL TO DNE PROPOSED FOR HELIOS-B. WILL BE TO GATHER INFORMATION ABOUT (1) PARTICLE FLOW, ENERGY, AND DIRECTION AS A FUNCTION OF DISTANCE FROM THE SUN. AND (2) GALACTIC COSMIC RAYS. E.G., TO MEASURE SOLAR PARTICLES CLOSE TO THE SUN. TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR PROTONS. ALPHA FARTICLES. AND ELECTRONS. TO MEASURE THE SPATIAL GRADIENT AND CHARGE SPECTRUM OF GALACTIC COSMIC RAYS. ETC. THE DETECTOR TO BE USED WILL CONSIST OF A SEMICONDUCTOR COUNTER. A CSI (TL) SCINTILLATOR, AND A QUARTZ CERENKOV COUNTER ENCLOSED BY AN ANTICOINCIDENCE CYLINDER AND WILL BE CAPABLE OF DETECTING PARTICLES FROM 1 TO 1000 MEV/NUCLEON. THE MEASUREMENTS WILL BE CORRELATED WITH OTHER ONBOARD EXPERIMENTAL RESULTS AND WITH DATA FROM SATELLITES IN EARTH CREIT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GALACTIC AND SOLAR COSMIC RAYS

NSSOC ID HELIO-B-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) NASA-GSEC GREENBELT, MD 01 - E.C. ROELDF U OF NEW HAMPSHIRE DURHAM. NH CI - 8.J. TEEGARDEN NASA-GSEC GREENEELT, ND 01 - F.B. MCDONALC NA SA -G SEC GREENBELT, NO 01 - K+G. MCCRACKEN U OF ADELATOE ADELAIDE. AUSTRALIA

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PARTICLE TELESCOPES DESIGNED TO MEASURE THE ENTIRE ENERGY RANGE OF 0.1 10 ABOUT ECC MEV FOR PROTONS AND HEAVIER PARTICLES (Z LESS THAN 10) AND CF 0.05 TO 5 MEV FOR ELECTRONS. ENERGY SPECTRA, AND CHEMICAL AND ISOTOPIC COMPOSITION OF GALACTIC AND SOLAR COSMIC RAYS WILL BE STUCIED. ACCITICNALLY. AN X-RAY COUNTER WILL MONITOR THE SOLAR X-RAY EMISSION. THE THREE TELESCOPES WILL BE CONSTRUCTED FROM THE ECLIPTIC FLANE.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- PLASMA DETECTORS

NSSDC ID HELIG-8-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) M.PLANCK INST.GARCHING GARCHING. W. GERMANY ROSENBAUER M.PLANCK INST.GARCHING GARCHING, W. GERMANY PI - H.R. PELLKOFEE 0I - H+ MOFFETT FIELD, CA NASA-ARC WOLFE CI - J.H.

## EXPERIMENT GRIEF DESCRIPTION

THESE DETECTORS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF THE PROTONS, ALPHA FARTICLES, AND ELECTRONS IN THE SOLAR WIND. A QUADRISPHERICAL ANALYZER WITH AN ENERGY PER CHARGE RANGE OF 231 V TO 16 KV. AN ANGULAR RESCLUTION OF 5 CEG IN AZIMUTH AND 5 DEG IN ELEVATION, AND A TIME RESCLUTION OF 30 SEC WILL BE USED TO DOSERVE PROTONS AND ALPHA PARTICLES. A HEMISPHERICAL ANALYZER WILL ALSO BE USED TO DETECT PROTONS AND ALPHA PARTICLES. ANOTHER HEMISPHERICAL ANALYZER WITH 10 ENERGY/CHARGE STEPS BETWEEN 16 V AND 1 KV, WILL BE USED TO CHSERVE ELECTRONS. MEASUREMENTS WILL BE MADE IN FIGHT EQUAL AZIMUTHAL SECTORS (45 DEG). THE INTEGRATION ANGLE IN ELEVATION WILL SE ABOUT 100 DEG.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC ELECTRON DETECTOR

NSSDC ID HELIO-B-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) M. FLANCK INST.LINDAU LINCAU, W. GERMANY KEPPLER PI - E. LINCAL. W. GERNANY W.PLANCK INST.LINDAL WILKEN 01 - 8. BCULDER. CO NCAA-ERL WILLIAMS 01 - D.J.

# EXPERIMENT ERIEF DESCRIPTION

ELECTRONS WITH ENERGIES BETWEEN 40 KEV AND 1 MEV WILL BE ENERGY SELECTED BY TWO PERMANENT MAGNETS AND COUNTED BY SEMICONDUCTOR DETECTORS. PRETGINS WILL BE DEFLECTED AND COUNTED SEPARATELY. THE FOINTING DIRECTION WILL BE WITHIN THE ECLIPTIC PLANE WITH AN APERTURE ANGLE OF ABOUT 20 DEG. THE TIME RESOLUTION WILL BE ON THE DRDER OF MINUTES.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ZCCIACAL LIGHT PHOTOMETER

NESCO ID HELIC-8-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) HEIDELBERG, W. GERMANY LAND DBS LEINERT PI - C. HEIÇELEERG. W. GERMANY LAND DES 01 - E. PITZ

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PHOTONETERS LOOKING AT 15 DEG. 30 DEG. AND 90 DEG FROM THE ECLIPTIC. THESE PHOTOMETERS WILL OBSERVE THE INTENSITY AND POLARIZATION OF THE ZODIACAL LIGHT IN WHITE LIGHT AND IN UV. BLUE, AND VISUAL BANDS. THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN INFORMATION ABOUT THE SPATIAL DISTRIBUTION. SIZE. AND NATURE OF

INTERPLANETARY CUST PARTICLES.

ON 12/18/72, THE SPACECHAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MICROMETEGROID DETECTOR AND ANALYZER NSSDC ID HELIU-8-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, QI=QTHER INVESTIGATOR)

PI - H. FECHTIG CI - J.

M.PLANCK INST. HEICELEG HEIDELEERG, W. GERMANY M.PLANCK INST.HEIDELEG HEIDELBERG, W. GERMANY

EXPERIMENT BPIEF DESCRIPTION

WEIFRAUCH

THE AIM OF THE EXPERIMENT WILL BE TO INVESTIGATE SOME THEORIES ABOUT THE INTERPLANETARY BUST INCLUDING WHETHER -- (1) THE NUMBER OF PARTICLES INCREASES TOWARD THE SUN. (2) THE CUT-CFF FOR SMALL PARTICLES IS DEPENDENT ON THE DISTANCE FROM THE SUN BECAUSE SCLAR PRESSURE INCREASES MEARER THE SUN. AND (3) THE NUMBER CENSITIES OF PARTICLES CHANGE NEAR THE DREITS OF PLANETS. THE KINETIC ENERGY OF DUST PARTICLES HITTING A TARGET WITH FIGH VELOCITY (SEVERAL KM/SEC) WILL CAUSE THE WATERIAL TO VAPORIZE AND BECCME PARTIALLY ICNIZED. THE GENERATED PLASMA CLCUD CAN THEN BE SEPARATED BY APPROPRIATE VOLTAGES INTO ITS NEGATIVE (ELECTRON) FART AND INTO POSITIVE IGNS. FROM THE IMPULSE HEIGHTS, THE MASS AND THE ENERGY OF THE DUST PARTICLES WILL BE DETERMINED. A TIME-OF-FLIGHT MASS SPECTACHETER IN CONNECTION WITH THE TARGET WILL ALLOW THE SMALL ICA CLOUD TO BE ANALYZED. IN THIS WAY THE INVESTIGATION OF THE CHEMICAL COMPOSITION OF THE DUST PARTICLES WILL BECOME POSSIBLE. THE THRESHOLD FOR THE DETECTION OF A PARTICLE WILL BE ABOUT 10 TO THE MINUS 15 GM. MASS AND ENERGY DETERMINATION WILL BE POSSIBLE FOR PARTICLES LARGER THAN ABOUT 10 TO THE NINES 14 GM. FOR PARTICLES LARGER THAN 10 TO THE MINUS 13 GM. A MASS SPECTRUM MAY BE GATHERED.

UN 12/18/72, THE SPACECRAFT MISSION WAS APPREVED.

SPACE CRAFT COMMON NAME - FEL TO CENTRIC ALTERNATE NAMES-STP PROBE. IME-H

NESDC ID HELCCTR

PLANNED LAUNCH DATE- CC/CC/78

SPACECRAFT WEIGHT IN CREIT-

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NASA-OSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- HELICCENTRIC

ORBIT PEFICE-365. DAYS

1. AU RAD PERIAPSIS-

1 . AU RAD

INCL INATION-O. DEG

SPACECRAFT PERSONNEL (PM=PRCJECT MANAGER, FS=PRCJECT SCIENTIST)

\* L \* L \* M4 MADDEN NASA-GSEC NASA-GSEC

GREENEELT. MO GREENEELT. MC

OGILVIE FS - K PS - T.T. VON RESERVINGE

NASA-GSFC

WASHINGTON' DC

# SPACECRAFT ERIEF CESCRIPTION

THE EXPLORER CLASS MELIOCENTRIC SPACECRAFT WILL BE PART OF THE MOTHER/DAUGHTER/FEL IOCENTRIC MISSION. THE PURPOSES OF THE MISSION WILL BE (1) TO INVESTIGATE SOLAR/TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE. (2) TO EXAMINE IN CETAIL THE STRUCTURE OF THE SOLAR WIND NEAR THE EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SGLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE LAUNCH OF THREE COORDINATED SPACECRAFT IN THIS MISSION WILL PERMIT THE SEPARATION OF SPATIAL AND TEMPORAL EFFECTS. THE HELIOCENTRIC SPACECRAFT WILL BE FLACED NEAR A LIBRATION POINT IN THE EARTH/SUN GRAVITATIONAL FIELD, ALLOWING IT TO REMAIN BEYOND THE MAGNETOSPHERIC CAVITY IN THE SOLAR WIND. IT WILL THUS CONTINUOUSLY MONITOR CHANGES IN THE NEAR-EARTH INTERPLANETARY MEDIUM. BECAUSE BOTH THE MOTHER AND DAUGHTER SPACECRAFT WILL FAVE ECCENTRIC GEOCENTRIC ORBITS: IT IS HOPED THAT THIS MISSION WILL MEASURE THE CAUSE/EFFECT RELATIONSHIPS BETWEEN THE INCIDENT SOLAR PLASMA AND THE MAGNETOSPHERE. FINALLY, THE HELICCENTRIC SPACECRAFT WILL ALSO PROVICE A NEAR-EARTH BASE FOR MAKING COSMIC RAY AND OTHER PLANETARY MEASUREMENTS FOR COMPARISON WITH COINCIDENT MEASUREMENTS FROM DEEP-SPACE PROBES.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 150-EV TC 7-KEV PROTON AND 5-EV TC 2.5-KEV ELECTRON PLASMA PFCBE

NSSOC IC HELOCTR-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHEF INVESTIGATOR) LOS ALAMOS SCI LAB LOS ALAMOS. NM PI - S.J. BAME LOS ALAMOS SCI LAG LCS ALAMES, NM ASBR IDGE ol - J.R. LOS ALAMOS. NM LOS ALAMOS SCI LAB HONES 01 - E.W. LCS ALAMES. NM LOS ALAMOS SCI LAB MONTGOMERY QI - M.D.

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MAKE AN INTEGRATED STUDY OF THE NATURE. ORIGIN AND EVOLUTION OF STRUCTURE IN THE INTERPLANETARY MEDIUM. ALSO, THE TERMAL STATE OF THE INTERPLANETARY PLASMA WILL BE STUDIED, UNPERTURBED BY THE EARTH'S BOW SHOCK. IN THE EXPERIMENT PROTON AND ELECTRON SCLAR PLASMA WILL BE MEASURED FROM 150 BY TO 7 KEV AND 5 BY TO 2.5 KEV IN 12 AND 16 ENERGY STEPS, RESPECTIVELY. PROTONS WILL BE MEASURED BY A 135-DEG SPHERICAL ELECTROSTATIC ANALYZER IN BOTH TWO AND THREE DIMENSIONS. STEP ENERGY RESOLUTION FOR EACH ENERGY WINDOW WILL BE 4.2 PERCENT. ELECTRONS WILL BE MEASURED BY A 90-DEC SPHERICAL ELECTROSTATIC ANALYZER. ALSO IN TWO AND THREE DIMENSIONS. THE ENERGY WINDOW PER STEP FOR ELECTRONS WILL BE 10 PERCENT. CHANNELTRON ELECTRON MULTIPLIERS WILL BE USED AS DETECTORS FOR EACH OF THE ANALYZERS.

ON 01/09/73, THE SPACECRAFT MISSIGN WAS PROPOSED.

EXPERIMENT NAME- MACNETIC FIELDS

NESDC ID HELCCTR-02

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR)
PI - E.J. SMITH NASA-JPL FASADENA. CA
OI - L. DAVIS CAL TECH PASADENA. CA
OI - G.L. SISCOE U OF CALIFORNIA, LA LOS ANGELES. CA

GI - D.E. JONES OI - B.T. TSURUTANI

BRIGHAM YOUNG U

PROVC. UT PASADENA. CA

### EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTATION FOR THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED, TRIAXIAL VECTOR HELIUM MAGNETOMETER. MEASUREMENTS WILL BE MADE OF THE STEADY MAGNETIC FIELD AND ITS LOW FREQUENCY VARIATIONS. SEVEN FIELD AMPLITUDE RANGES (MINUS TO PLUS 4, 14, 42, 64C, 4,000, 22,000, AND 140,000 GAMMAS) WILL BE AVAILABLE. THE FREQUENCY RESPONSE WILL BE 0 TO 3 HZ WITH 3 BANDS (0.1 TO 1, 1 TO 3, 3 TO 10 HZ) FOR MEASUREMENTS OF FLUCTUATIONS PARALLEL TO THE SPACECRAFT SPIN AXIS.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- LOW-ENERGY COSMIC-RAY COMPOSITION

NSSOC IC HELOCTR-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - D.K. HOVESTACT M.PLANCK INST.GARCHING GARCHING. WEST GERMANY OF - J.J. G\* GALL AGHER U OF MARYLAND CCLLEGE FARK, MD 01 - C.Y. FAN U OF ARIZONA TUCSON, AZ 01 - G. GLOECKLER U OF MARYLAND COLLEGE FARK. MD OI - M. SCHOLER MaPLANCK INSTAGARCHING GARCHING. W. GERMANY

OI - L.A. FISK NASA-GSEC GREENBELT. MD

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE FELIOCENTRIC AND NOTHER SPACECRAFT, THE NUCLEAR AND IONIC CHARGE AS WELL AS ISOTOPIC COMPOSITION OF INTERPLANETARY AND MAGNETOSPHERIC FEAVY PARTICLES. MEASUREMENTS WILL BE MADE OF THE FOLLOWING SPECIES IN THE CESIGNATED RANGES -- (1) SCLAR WIND IRON (5 KEV/CHARGE TO 20 MEV/NUCLEON). (2) SUPRATHERMAL MULTIPLE-CHARGED IONS (2 · LE · 26 IN THE ENERGY RANGE 5 TO 50 KEV/ NUCLEON). (3) LCW-ENERGY COSMIC RAYS (0 · 05 TO 20 MEV/NUCLEON). AND (4) TRAPPED PARTICLES (0 · 05 TO 6 MEV/NUCLEON). THE INSTRUMENTATION WILL CONSIST OF TWO SENSORS ON EACH SPACECRAFT THAT WILL USE ELECTROSTATIC DEFLECTION TECHNIQUES. THIN WINDOW FROFERTIONAL COUNTERS. AND POSITION SENSITIVE SOLID-STATE DETECTORS. THE SENSORS WILL HAVE LARGE GEOMETRICAL FACTORS OVER THE ENTIRE ENERGY RANGE. I.E., 0.04 SQ CM STER FOR THERMAL AND SUPPLIFIERMAL SOLAR WIND MEASUREMENTS AND 3 SG CM STER FOR LOW-ENERGY COSMIC RAY MEASUREMENTS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROFOSED.

EXPERIMENT NAME- SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES

NSSCC IC HELUCTR-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) PI - T.T. VON ROSENVING NASA-GSFC GREENBELT, MD OI - L.A. FISK NASA-GSEC GREENBELT, MD MCCONALC . CI - F.B. NASA-GSFC GREENEELT. NO 01 - J.H. TRAINOR NASA-GSFC GREENEELT. MC OI - M.A.I. VAN HOLLEBEKE NASA-GSEC GREENEELT, MD

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE CONFUSITION OF SCLAR COSMIC RAYS FROM HYDROGEN THROUGH IRON AND THE ELEMENTAL ABUNDANCE OF GALACTIC

COSMIC RAYS. THREE PARTICLE TELESCOPES FLUS A PROPORTIONAL COUNTER. FOR MEASUREMENT OF ELECTRONS AND X RAYS, WILL COMPRISE THE INSTRUMENTATION. NUCLEI WITH Z BETWEEN 1 AND 26 WILL BE MEASURED IN VARIOUS ENERGY WINDOWS IN THE RANGE 0.5-ECC MEV PER NUCLEON. ISOTOFES IN THE 2 RANGES 1 TO 2. 3 TO 7. AND 8 TO 16 WILL BE MEASURED IN THE ENERGY RANGES 4 TO 80, 8 TO 120. AND 10 TO 200 MEV PER NUCLEON. RESPECTIVELY. ELECTRONS WILL BE MEASURED IN THE ENERGY RANGES 0.07 TO C.2 MEV AND 0.3 TC 12 MEV.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- HIGH-ENERGY COSMIC RAYS

NSSCC IC FELOCTR-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) LAWRENCE BERKELEY LAS BEFKELEY & CA HECKMAN Pi - H.H. U DE CALIFORNIA, BERK BERKELEY, CA GRE INE F n1 - C.

# EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE ISOTOPIC ABUNDANCE IN THE PRIMARY COSMIC FAYS FOR HYDROGEN THROUGH IRON. THE INSTRUMENT WILL BE A 10-ELEMENT SOLIC-STATE PARTICLE TELESCOPE CONSISTING OF LITHIUM DRIFTED SILICON DETECTORS. ENERGY RANGES MEASURED WILL RUN FROM 31 TO 110 MEV FOR Z=1. AND FROM 125 TC 445 MEV FOR Z=26. ISOTOPIC RESOLUTION WILL BE LESS THAN 0.15 AMU FOR Z=1 THROUGH 26. DIRECTION OF INCIDENT NUCLEI WILL BE OBTAINED FROM A PAIR OF MULTI-WIRE PROPROTIONAL COUNTERS WITH 2 DEG RESOLUTION.

ON 01/09/73. THE SPACECRAFT WISSICH WAS PROFISED.

EXPERIMENT NAME- COSMIC-RAY ELECTRONS AND NUCLEI

NESCO ID HELCCTR-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) U OF CHICAGO CHICAGO . IL PI - P. MEYER CHICAGE, IL L OF CHICAGO EVENSON 01 - P.

## EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY PARTICLE PROPAGATION WITHIN THE SOLAR SYSTEM AND THE PROPERTIES OF THE INTERPLANETARY MEDIUM. THE FOLLOWING SPECIES WILL BE RESOLVED -- (1) ELECTRONS (DIFFERENTIAL SPECTRUM FROM 5 TO 400 MEV), (2) PRETONS (DIFFERENTIAL SPECTRUM FROM 36 TO 13,000 NEV AND INTEGRAL SPECTRUM ABOVE 13 GEV). (3) HELIUM THROUGH SULFUR (Z FROM 2 THROUGH 16. DIFFERENTIAL SPECTRUM FROM 60 TO 12.CCG MEVANUCLECK AND INTEGRAL SPECTRUM ABOVE 13 GEV/NUCLEON). AND (4) THE IRON GROUP (2 FROM 26 THROUGH 28. DIFFERENTIAL SPECTRUM FROM 150 TO 13.000 MEV/NUCLEON. AND INTEGRAL SPECTRUM ABOVE 13 GEV/NUCLECN). A CHARGED PARTICLE TELESCOPE WILL SE USED TO MAKE THESE MEASUREMENTS. IT WILL CONSIST OF A CURVED SOLID-STATE DETECTOR. A GAS CENENKOV COUNTER, A SOLID-STATE DETECTOR, A CESIUM IGDIDE SCINTILLATION DETECTOR, A PLASTIC SCINTILLATION COUNTER, AND A GLARTZ CERENKOV COUNTER. THE DESIGN OF THE TELESCOPE IS BASED ON THAT USED IN EXPERIMENT 68-0144-09 FOR OGG 5.

ON 01/09/73, THE SPACECRAFT MISSICN WAS PROFESED.

EXPERIMENT NAME- 20-HZ TO 1-KHZ MAGNETIC AND 20-HZ TO 100-KHZ ELECTRIC FIELD DETECTORS

NSSEC IE HELOCTR-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHEF INVESTIGATOR)

PI - F.L. SCARF TRW SYSTEMS GROUP
OI - D.A. GURNETT U CF 10MA

TRW SYSTEMS GROUP REDONDE BEACH. CA
U CF IOWA ICWA CITY. IA

OI - E.J. SMITH NASA-JPL PASADENA, CA

OI - R.W. FREDERICKS TRW SYSTEMS GROUP RECENCE BEACH, CA

## EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO PROVICE CATA FOR PLASMA WAVE STUDIES UNDERTAKEN TO GAIN A SETTER UNDERSTANDING OF THE WAVE PARTICLE INTERACTION AND PLASMA INSTABILITIES WHICH LEAD TO THE EQUIVALENT COLLISION PHENOMENA THAT PRODUCE APPARENT FLUIC-LIKE BEHAVIOR IN THE SCLAR WIND NEAR 1 AU. AN ELECTRIC DIPOLE AND MAGNETIC SEARCH COIL, BOOM-MOUNTED AND ALIGNED ALONG THE SPACECRAFT SPIN AXIS. WILL BE USED TO MEASURE MAGNETIC FIELD WAVE LEVELS FROM 20 HZ TO 1 KHZ IN SIGHT CHANNELS AND ELECTRIC FIELD LEVELS FROM 20 HZ TO 100 KHZ IN 16 CHANNELS.

ON 01/09/73, THE SPACECRAFT MISSICN WAS PROFCSED.

#### EXPERIMENT NAME- ENERGETIC PROTONS

NESDC IC HELCCTR-08

EXPER IMENT	PERSONNEL (PI=PRINCI	PAL INVESTIGATOR, DI=CT	FER INVESTIGATORA
PI - H.	ELLIOTT	IMPERIAL COLLEGE	1 ONDON - FACIAND
	VAN RODIJEN	SPACE RESEARCH LAR	LETTER. THE NETHERNANDS
01 - J.W.	VAN GILS	SPACE RESEARCH LAB	LEICEN, THE NETHERLANDS
01 - R.M.	AND DEN KIEUMENFOR	SPACE RESEARCH LAB	LEICEN . THE NETHERLANDS
01 - K.P.	WENZEL	EUR SPACE TECH CENTER	NCCROWLIK. THE NETHERLANDS
	DE FEITER	SPACE RESEARCH LAB	LEICEN, THE NETHERLANDS
DI - A.C.		EUR SPACE TECH CENTER	NCCECHIJK . THE NETHERLANDS
01 - T.R.		EUR SPACE TECH CENTER	NCCRDNIJK. THE NETHERLANDS
01 - R.J.	HYNDS	IMPERIAL COLLEGE	LONDON. UNITED KINGDOM
01 - V.	DOMINGC	EUR SPACE TECH CENTER	
01 - D.E.	PA GE	EUR SPACE TECH CENTER	NCCHOWIJK. THE NETHERLANDS
	BALOGH	IMPERIAL COLLEGE	LUNDON, UNITED KINGDOM
OI - C.	LE JACER	SPACE RESEARCH LAB	LEIGEN. THE NETHERLANDS

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY PARTICLE ACCELERATION AND PROPAGATION PROCESSES IN DIFFERENT PARTS OF THE MAGNETOSPHERE AND IN INTERPLANETARY SPACE. MEASUREMENTS WILL BE MADE OF PROTONS FROM 0.03 TO 1.40 MEV AND ALPHA PARTICLES FROM 1.40 TO 6.CC MEV USING THREE TWO-ELEMENT TELESCOPES. ONE TELESCOPE WILL LOOK PARALLEL TO THE SPACECRAFT SPIN AXIS WHILE THE OTHERS WILL SCAN IN EIGHT SECTORS. MOUNTED AT 60 DEG AND 120 DEG TO THE SPIN AXIS.

ON 01/09/73, THE SPACECRAFT MISSICH WAS PROFOSED.

EXPERIMENT NAME- X-FAYS AND ELECTRONS

NSSDC ID HELDCTR-09

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - K.A. ANDERSON U OF CALIFORNIA, BERK BERKELEY, CA

U OF CALIFORNIA. BERK BERKELEY. CA LIN 01 - R.P. BCULDER. CO HIGH ALTITUDE OBS SMITH 01 - D.F. U OF CALIFORNIA, BERK BERKELEY, CA OI - S.R. KANE

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY INTERPLANETARY AND SCLAR ELECTRONS (2 TO 1000 KEV) IN THE TRANSITION ENERGY RANGE BETWEEN SOLAR WIND AND LOW-ENERGY COSMIC RAYS. AND TO STUCY SOLAR X RAYS (8 TO 72 KEV). THE ELECTRONS WILL EE MEASURED BY A PAIR OF PASSIVELY COOLED. SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES AND BY A HEMISPHERICAL PLATE ELECTROSTATIC ANALYZER WITH CHANNEL-MULTIPLIER DETECTORS. THE X RAYS WILL BE MEASURED BY A PROPERTIONAL COUNTER WITH A SOCIUM ICDIDE SCINTILLATOR.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME+ 2C-KHZ TC 3-MHZ RADIO MAPFING

NSSCC IC FELCCTR-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR) CHALATS NEUDCH. FRANCE MEUDON CBSERVATORY PI - J.L. STEINEERG CHALATS MEUDON. FRANCE MEGOCH CASERVATORY 01 - P. COUTURIER CHALATS MEUCON. FRANCE MEUDON DOSERVATORY KNOLL 01 - R+ GREENEELT. ND NASA-GSEC FAINBERG C1 - J. GREENEELT. MD NA SA -G SFC STONE 01 - E.G. GREENBELT. MD NASA-GSFC MOSIER OI - S.R.

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF FOUR SELF-CALIBRATING RADIOMETERS THAT STEP THROUGH 16 FREQUENCIES BETWEEN 20 KHZ AND 3 MHZ. THESE RACICMETERS ARE CONNECTED TO DIFFUE ANTENNAS. TYPE 3 SCLAR RADIO BURSTS WILL BE USED TO MAP MAGNETIC LINES OF FORCE IN AND OUT OF THE ECLIPTIC BETWEEN 0.05 AND 1 AU. THEREBY PRODUCING A THREE-DIMENSICNAL DESCRIPTION OF THE SCLAR WIND.

ON 01/09/73. THE SPACECRAFT MISSICH WAS PROFESED.

EXPERIMENT NAME- MASS SPECTRUMETER FOR 470 TO 10,500 EV NSSDC ID HELOCTR-11 PER CHARGE AND 1 TO 5.5 AML FER CHARGE

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR. 01=0THER INVESTIGATOR) GREENEELT: ND NASA-GSFC CIGILV IE PI - K.W. BERNE . SWITZERLAND U OF BERNE CI - J. GEISS GREENBELT. MD NASA-GSEC ACUNA OI - M.H. CULLEGE PARK, MD U OF MARYLAND 01 - M.A. CUPLAN HOLSTON, TX NASA-JSC 01 - D.L. LIND

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN ELECTROSTATIC ENERGY ANALYZER AND A WIEN VELOCITY FILTER CONFIGURED AS A MASS SPECTROMETER TO DETERMINE THE CHARGE STATE AND ISOTOPIC CONSTITUTION OF THE SCLAR WINE. THE INSTRUMENT WILL HAVE AN ENERGY PER UNIT CHARGE RANGE OF 0.47 TO 10.5 KEV AND A MASS PER UNIT CHARGE HANGE OF 1 TO 5.6.

ON 01/09/73. THE SPACECRAFT MISSION WAS FREFESED.

EXPERIMENT NAME - COSMIC-RAY COMPUSITION

NSSDC ID HELOCTR-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - E.C. STONE

CAL TECH

PASADENA. CA

01 - R.E. VOGT

CAL TECH

PASADENA. CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUCY THE ISOTOPIC CONSTITUTION OF SOLAR MATTER AND GALACTIC COSMIC-RAY SCURCES, THE FROCESSES OF NUCLEOSYNTHESIS IN THE SUN AND IN THE GALAXY. AND THE ASTROPHYSICAL PARTICLE ACCELERATION PROCESSES. THE FOLLOWING SPECIES ARE TO BE RESCUVED -- LITHIUM THROUGH NICKEL (2 FROM 3 THROUGH 28 AND A FROM 6 THROUGH 64) IN THE ENERGY RANGE FROM 2 TO 200 MEV/NUCLEON. THE CORRESPONDING MASS RESOLUTION IS 0.065 TO 0.083 PROTON MASS FOR LITHIUM. AND C.18 TO 0.22 FROTON MASS FOR IRON. THE ISOTOPIC ABUNDANCES AND ENERGY SPECTRA WILL BE NEASURED BY A HEAVY ISCTOPE SPECTROMETER TELESCOPE THAT USES SOLID-STATE CHARGED PARTICLE DETECTORS. ANTICCINCIDENCE GUARD RINGS AND SOLID-STATE MATRIX HECCSCOPE DETECTORS ARE EMPLOYED TO IMPROVE MASS AND ENERGY RESCLUTION.

ON 01/09/73, THE SPACECRAFT MISSICH WAS PROFESED.

EXPERIMENT NAME- SOLAR AND INTERPLANETARY MAGNETIC FIELDS NESDC ID HELOCTR-13 (CCRRELATIVE STUDY)

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, CIECTHER INVESTIGATOR) PI - J.M. WILCOX STANFORD U STANFORE, CA

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THE MEASUREMENT OF LARGE SCALE SCLAR MAGNETIC AND VELCCITY FIELDS WITH THE STANFORD GROUND-BASED SOLAR TELESCOPE. AND THE COMPARISON OF THESE MEASUREMENTS WITH WEASUREMENTS OF THE INTERPLANETARY MAGNETIC FIELD AND SOLAR WIND MADE BY OTHER EXPERIMENTS ON THIS SPACECRAFT. THE PURPOSE OF THE EXFERIMENT WILL BE TO STUDY THE LARGE SCALE STRUCTURE OF THE SULAR MAGNETIC FIELD AND ITS EXTENSION INTO INTERFLANETARY SPACE BY THE SCLAR WIND.

ON 01/09/73, THE SPACECRAFT MISSIAN WAS PROPOSED.

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SPACECRAFT COMMON NAME- HELDS ALTERNATE NAMES-HI.ECCEN.LUN.DCCULT.SAT.

NSSCC IC FELCS

PLANNED LAUNCH DATE- 08/00/79

SPACECRAFT WEIGHT IN CREIT-

LAUNCH SITE-

LAUNCH VEHICLE-

FUNDING AGENCY INTERNATIONAL

ESRO

PLANNED OREIT PARAMETERS

ORBIT TYPE- CECCENTRIC APOAPSIS- 200000 . KM ALT

ORBIT PERIOD-PER IAPSIS-

MIN INCLINATION-KM ALT

60.0 DEG

SPACECRAFT PERSUNNEL (PM=PRCJECT MAHAGER, FS=FRCJECT SCIENTIST)

PM -UNKNOWN HINKNEWN

PS -UNKNOWN UNKNOWN

#### SPACECRAFT ERIEF DESCRIPTION

THE COJECTIVES OF THIS MISSION WILL BE THE MEASUREMENT OF THE POSITION, STRUCTURAL FEATURES, SPECTRAL, AND TEMPERAL CHARACTERISTICS OF COSMIC X-RAY SOURCES. THE POSITION AND CLAMETER OF COSMIC X-RAY SOURCES WILL BE DETERMINED BY THE OBSERVATION OF THE TIME AND SPEED WITH WHICH THE SOURCES DISAPPEAR BEHIND THE MOON DUPING LUNAR OCCULTATIONS. THE ABILITY TO CURRECT BUTH THE FREIT AND THE CRIENTATION OF THE SPACECRAFT. COUFLED WITH THE HIGHLY-ECCENTRIC GRBIT, WILL ENABLE THE SPACECRAFT TO CHSERVE ANY PURTICN OF THE SKY FOR LONG PERIODS OF TIME. TEMPORAL VARIATIONS ON SCALES MANGING FRUM TENS OF MICROSECTINGS TO TENS OF HOURS WILL SE CESSERVABLE. AS WELL AS ENERGY SPECTRUM OBSERVATIONS AND ABSOLUTE FLUX MEASUREMENTS OF OBJECTS WITH AN INTENSITY GREATER THAN 5 TIMES 10 TO THE -5 THAT OF THE CRAB MEBULA. BRIGHT SCURCES WILL BE EJECTABLE TO WITHIN ARC-SEC IN POSITION.

ON 01/00/73, THE SPACECRAFT MISSICH WAS PROFESED.

EXPERIMENT NAME- MEDIUM-ENERGY COSMIC X-RAY PACKAGE

NSSDC 10 HELDS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) UNKNOWN UNKIGUN FI -

EXPERIMENT ERIEL DESCRIPTION

THIS EXPERIMENT, WHICH WILL DESERVE COSNIC X-RAY SOURCES IN THE ENERGY HANGE OF 1.5 TO 20 KEV. WILL CONSIST OF PROPORTIONAL COUNTERS LOCATED BEHIND MODIFIED HONEYCOMB COLLIMATORS.

CN 01/00/73, THE SPACECRAFT MISSICN WAS PROFESED.

EXPERIMENT NAME- LOW-ENERGY COSMIC X-RAY PACKAGE

NEEDC ID HELCS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATER, CI=CTHER INVESTIGATOR) LNKNOWN UNKNEWN

EXPERIMENT ERIEF CESCRIFTIJN

THIS EXPERIMENT, WHICH WILL OBSERVE COSMIC X-RAY SOURCES IN THE 0.1-TO 2-KEV PANGE. WILL UTILIZE THIN-WINDOW. POSITION-SENSITIVE PROPORTIONAL COUNTERS LACATED BEHIND GRAZING-INCIDENCE WIRRORS.

ON 01/00/73, THE SPACECRAFT MISSICN WAS PROFESED.

SPACECRAFT COMMON NAME- IMP-J ALTERNATE NAMES- PL-723A

NSSDC ID IMP-J

PLANNED LAUNCH CATE- 11/00/73

SPACECRAFT WEIGHT IN DRBIT-

270 . KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNCING AGENCY
UNITED STATES

NASA-OSS

PLANNED GRUIT PARAMETERS

ORBIT TYPE- GEOCENTRIC GRBIT PERIOD- 17760. MIN

APRIAPSIS- 243622. KM ALT - FERIAPSIS- 213622. KM ALT INCLINATION-

26 DEC

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=PROJECT SCIENTIST)

PM - W.R. LIMBERTS
PS - N.F. NESS

MASA-CSEC NASA-GSEC

GREENEELT, MD

GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

IMP-J THE LAST SATELLITE OF THE INF SERIES, IS A CRUM-SHAPED SPACECRAFT, 135.6 CM ACROSS AND 187.4 CM FIGH, INSTRUMENTED FOR STUDIES OF COSMIC RAYS. ENERGETIC SOLAR PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. ITS NEARLY CIPCULAR CREIT AT 30 TO 40 EARTH FACII WILL PERMIT UBSERVATIONS IN NEAR INTERPLANETARY SPACE AND IN THE EARTH'S MAGNETOTAIL. THE SPACECRAFT SPIN AXIS IS TO BE NORMAL TO THE ECLIPTIC PLANE, AND THE SPIN RATE IS TO BE 23 RPM. MOST CHARACTERISTICS OF THE IMP-J MISSION ARE SIMILAR TO THOSE OF THE STILL ACTIVE IMP-7. THE FREVIOUS SPACECRAFT IN THE SUCCESSFUL IMP SERIES. IT IS PLANNED THAT IMP-J AND IMP-7 WILL BE ABOUT 180 DEG OUT OF PHASE IN THEIR SIMILAR CREITS. IMP-J WAS SUCCESSFULLY LAUNCHED UCTOBER 26, 1973 (UT) AND WAS DESIGNATED EXPLORER 50.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD EXPERIMENTS

NESCC IC INF-J -01

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - N.F. NESS

NA SA = GSFC

GREENBELT, MD

GI - C.S. SCEAPCE

NASA-GSEC

GREENHELT MD

CI - J.B. SEEK

NA SA = GSFC

GREENEELT, NO

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CLASIST OF A BOOK-MOUNTED TRIAXIAL PLUXGATE MAGNETOMETER DESIGNED TO STUDY THE INTERPLANETARY AND GEOMAGNETIC TAIL MAGNETIC FIELDS. EACH SENSOR WILL HAVE THREE DYNAMIC RANGES. PLUS OR MINUS 12, PLUS OR MINUS 37. AND PLUS OR MINUS 10E GAMMAS. WITH THE AID OF A BIT COMPACTION SCHEME (DELTA MODULATION), THERE WILL BE 2E VECTOR MEASUREMENTS MADE AND TELEMETERED PER SECOND.

ON 12/18/72. THE SPACECRAFT MISSICH WAS APPREVED.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID INF-J -02

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, CIECTER INVESTIGATOR)

PI - H.S.	ERIDGE	MIT	CAMERIDGE. MA
• •	LAZARUS	MIT	CAMBRIDGE . MA
01 - A. J.	B INS ACK	MIT	CAMBRIDGE. MA
01 - J.H.	LYON	MIT	CAMERIDGE . MASS .

## EXPERIMENT BRIEF DESCRIPTION

A MODULATEC SPLIT-COLLECTOR FARADAY CUP WHICH WILL BE PERPENCICULAR TO THE SPACECRAFT SPIN AXIS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SCLAR WIND. TRANSITION REGION. AND MAGNETOTALL. ELECTRONS WILL BE STUDIED IN EIGHT LCGARITHMICALLY EQUISPACED ENERGY CHANNELS EETWEEN 17 EV AND 7 KEV. POSITIVE IONS WILL BE STUDIED IN EIGHT CHANNELS EETWEEN 50 EV AND 7 KEV. A SPECTRUM WILL SE DETAINED EVERY EIGHT SPACECRAFT REVOLUTIONS. ANGULAR INFORMATION WILL BE DETAINED IN EITHER 15 EQUALLY SPACED INTERVALS DURING A 360-CEG REVOLUTION OF THE SATELLITE OR MORE CLOSELY ABOUT THE SPACECRAFT SUN LINE.

ON 12/18/72. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- SOLIC-STATE DETECTORS

NESDC ID IMP-J -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PI - G. GLOECKLER U OF MARYLAND CCLLEGE PARK, MD

OI - C.Y. FAN U OF ARIZONA TUCSON, AZ

OI - D.K. HOVESTACT M.PLANCK INST.GARCHING GARCHING, WEST GERMANY

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF LOW-ENERGY PARTICLES OBSERVED DURING SOLAR FLARES AND 27-DAY RECURRENT EVENTS. THE DETECTORS TO BE USED WILL INCLUDE (1) AN ELECTROSTATIC ANALYZER (TO SELECT PARTICLES OF THE DESIRED ENERGY PER CHARGE) COMBINED WITH AN ARRAY OF WINDOWLESS SOLID-STATE DETECTORS (TO MEASURE THE ENERGY LOSS) AND SURROUNDED BY AN ANTICOINCIDENCE SHIELDING AND (2) A THIN WINDOW PROPORTIONAL COUNTER, SCLID-STATE PARTICLE TELESCOPE. THE EXPERIMENT WILL MEASURE PARTICLE ENERGIES FROM 0.1 TO 10 MEV PER CHARGE IN 12 BANDS AND WILL UNIQUELY IDENTIFY POSITEORS AND ELECTRONS AS WELL AS NUCLEI WITH CHARGES OF 2 FROM 1 TO 8 (NO CHARGE RESOLUTION FOR 2 GREATER THAN 8). TWO 1000-CHANNEL PULSE HEIGHT ANALYZERS, ONE FOR EACH DETECTOR, WILL BE INCLUDED IN THE

ON 12/18/72. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS AND NESDC ID IMF-J -04
ELECTRONS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTER INVESTIGATOR)
PI - L.A. FRANK L OF IOWA ICWA CITY, IA

#### EXPERIMENT ERIEF CESCRIFTION

THIS EXPERIMENT IS CESIGNED TO MEASURE THE ENERGY SPECTRA OF LOW-ENERGY ELECTRONS AND PROTONS IN THE GEOCENTRIC RANGE 30 TO 40 R(E) TO GIVE FURTHER CATA ON GEOMAGNETIC STORMS, AURORA, TAIL AND NEUTRAL SHEET, AND OTHER MAGNETOSPIERIC PHENOMENA. THE DETECTOR WILL BE A DUAL-CHANNEL CURVED PLATE ELECTROSTATIC ANALYZER (LEPEDEA - LOW ENERGY PROTON AND ELECTRON DIFFERENTIAL ANALYZER) WITH 16 ENERGY INTERVALS BETWEEN 5 EV AND 50 KEV. IT WILL HAVE AN ANGULAR FIELD OF VIEW OF 9 DEG X 25 DEG. THE DETECTOR MAY BE

OPERATED IN ONE OF TWO MODES (1) ONE PROVIDING GOOD ANGULAR RESCLUTION (16 DIRECTIONS FOR EACH PARTICLE ENERGY BAND) ONCE EACH 272 SEC. AND (2) ONE PROVIDING GOOD TEMPORAL RESOLUTION IN WHICH THE ENTIFE ENERGY RANGE IN FOUR DIRECTIONS WILL EE MEASURED EVERY 68 SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSCC IC IMP-J -05

EXPERIMENT PERSONNEL (PI = PRINCIPAL INVESTIGATOR. DI = CTHER INVESTIGATOR) PI - Dada WILLIAMS NOAA-ERL BCULDER. CO DI - C.O. BESTROM APPLIED PHYSICS LAB SILVER SFRING. MD 01 - J.C. ARMSTRONG APPLIED PHYSICS LAB SILVER SPRING. MD GI - J.H. TRAINOR NASA-GSFC GREENEELT. NO

#### EXPERIMENT BRIEF. DESCRIPTION

THE PURPOSES OF THIS EXPERIMENT WILL BE (1) TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR COSMIC RAYS THROUGH THE INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW. (2) TO STUDY ELECTRON AND PROTON PATCHES THROUGHOUT THE GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE MAGNET CPAUSE, AND (3) TO STUDY THE ENTRY OF SOLAR CÓSMIC RAYS INTO THE GEOMAGNETIC FIELD. THE INSTRUMENTATION WILL CONSIST OF A THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLIC-STATE DETECTORS AND A MAGNETIC FIELD TO DEFLECT ELECTRONS. TWO SIDE-MOUNTED DETECTORS WILL BE USED TO DETECT THE ELECTRONS DEFLECTED BY THE MAGNET. TWO ADDITIONAL SOLID-STATE DETECTORS WILL BE USED TO DETECT VERY LOW-ENERGY (GREATER THAN 15 KEV) PROTONS, ALPHA PARTICLES, AND CHARGED PARTICLES OF Z GREATER THAN 2. THE EXPERIMENT WILL BE DESIGNED TO MEASURE (1) FROTON FLUXES FROM 30 KEY TO GREATER THAN 8.6 MEY IN SIX RANGES. (2) ELECTRON FLUXES FROM 30 KEV TO GREATER THAN 450 KEV IN THREE RANGES, (3) CHARGED PARTICLES GREATER THAN 15 KEV. (4) ALPHA PARTICLES IN FOUR RANGES, GREATER THAN 0.5 MEV, GREATER THAN 1.6 MEV, 2.2 TO 8.8 MEV, AND 8.8 TO 35 MEV. AND (5) CHARGED PARTICLES OF Z GREATER THAN 2 AT E GREATER THAN 5 MEV.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRONS AND HYDROGEN AND HELIUM NSSCC ID IMP-J -06
ISOTOPES

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

PI - E.C. STONE CAL TECH PASADENA. CA

OI ~ R.E. VOGT CAL TECH PASADENA. CA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY (VIA DIFFERENTIAL ENERGY SPECTRA) LOCAL ACCELERATION OF PARTICLES. ACCELERATION PROCESSES OF SOLAR PARTICLES. STORAGE IN THE INTERPLANETARY MEDIUM. AND SCLAR MCDULATION OF PARTICLES IN THE INTERPLANETARY MEDIUM. THE DETECTOR TO BE USED IS A MULTI-ELEMENT. TOTALLY DEPLETED SOLIC-STATE TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND IS TO BE OPERATED IN ONE OF THREE MODES -- (1) THE ENERGY RANGE MODE. (2) THE ELECTRON MODE (150 KEV TO 2.8 MEV), AND (3) THE HYDROGEN AND HELIUM ISOTOPES MODE (0.5 TO 40 MEV/NUCLEON). THE DETECTOR WILL HAVE AN ANGULAR RESOLUTION OF FLUS TO MINUS 22 DEG.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCLAR FLARE FIGH-Z/LOW-E AND LOW-Z NSSDC ID IMF-J -07 EXPERIMENTS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) L OF CHICAGO CHICAGE. IL PI - J.A. SIMPSON CHICAGO. IL U OF CHICAGO MUNDZ DI - M.G.

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INCREASE THE UNDERSTANDING OF SOLAR FLARE PARTICLE ACCELERATION AND PARTICLE CONTAINMENT IN MAGNETIC FIELDS IN THE VICINITY OF THE SUN. THE DETECTOR WILL POINT ALONG THE SPACECRAFT SPIN AXIS. IT WILL BE A WINDOWLESS DE/DX VS E TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND CAN BE OPERATED IN EITHER OF TWO MODES - (1) A HIGH-Z. LOW-E MODE HAVING AN ENERGY RANGE FROM 0.5 TO EC MEV/NUCLEON AND A CHARGE RANGE Z FROM 5 TO 50 AND (2) A LOW MODE HAVING AN ENERGY RANGE 6 TO 1200 MEV/NUCLEON (ISOTOPES - HYDROGEN, DELTERIUM, TRITIUM, HELIUM-3, HELIUM-4). THE ENERGY RANGE FOR ELECTRONS WILL BE PRIMARILY 0.3 TO 10 MEV. THE ACCEPTANCE ANGLE OF THE DETECTOR WILL BE BE 50 DEG FULL ANGLE.

ON 12/18/72, THE SPACECRAFT MISSICH WAS APPROVED.

NESDC ID IMP-J -08 EXPERIMENT NAME- FROMAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) APPLIED PHYSICS LAB SILVER SPRING. MD PI - S.M. KRIMIGIS U OF KANSAS I AWRENCE - KS ARMSTRONG Q1 - T.P. U OF IOWA IDWA CITY. IA VAN ALLEN 01 - J. A.

#### EXPERIMENT BRIEF DESCRIPTION

THREE SOLIC-STATE DETECTORS IN AN ANTICCINCIDENCE PLASTIC SCINTILLATOR WILL OBSERVE ELECTRONS BETWEEN 0.2 AND 2.5 MEV. PROTONS BETWEEN 0.3 AND 500 MEV. ALPHA PARTICLES BETWEEN 2.0 AND 200 NEV. HE AVY FAFTICLES WITH Z VALUES RANGING FROM 2 TO 5 WITH ENERGIES GREATER THAN 8 NEV. HEAVY FARTICLES WITH Z VALUES RANGING BETWEEN & AND & WITH ENERGIES GREATER THAN 32 MEV. AND INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLEON. ALL WITH DYNAMIC RANGES OF 1 TO ONE MILLION (FER SQUARE CH-SEC-STER). FIVE THIN WINDOW GEIGER-MUELLER TUGES WILL COSERVE ELECTRONS OF ENERGY GREATER THAN 15 KEV. PROTONS OF ENERGY GREATER THAN 250 KEV, AND X RAYS WITH WAVELENGTHS BETWEEN 2 AND 10 A. ALL WITH A DYNAMIC FANGE OF 10 TO 100 MILLION (PER SQUARE CM-SEC-STER). PARTICLES AND X RAYS PRIMARILY CF SOLAR CRIGIN WILL BE STUDIED. BUT THE DYNAMIC RANGE AND RESOLUTION OF THE INSTRUMENT WILL PERMIT COSMIC RAYS AND MAGNETOTAIL PARTICLES TO BE CHSERVED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR- AND COSMIC-RAY PARTICLES

NSSCC IC IMP-J -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) GREENEELT. MD NASA-GSEC PI - F.B. MCDONALC

OI - D.E. HAGGE CI - B.J. TEEGARDEN

NASA-JSC NASA-GSFC

HCUSTON, TX
GREENEELT, ND

## EXPERIMENT BRIEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT WILL BE DESIGNED TO MEASURE ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVIER NUCLEI UP TO Z = 30. THREE DISTINCT DETECTOR SYSTEMS WILL BE USEC. THE FIRST SYSTEM WILL CONSIST OF A FAIR OF SCLID-STATE TELES COPES WHICH MEASURE INTEGRAL FLUXES OF ELECTRONS ABOVE 150, 350, AND 700 KEV AND OF PROTONS ABOVE .05, .15, .50, .70, 1.0, 1.2, 2.0, 2.5, 5.0, 15, AND 25 MEV. EXCEPT FOR THE .05 MEV PROTON MODE, ALL COUNTING MODES WILL HAVE UNIQUE SPECIES IDENTIFICATION. THE SECOND DETECTOR SYSTEM WILL BE A SOLID-STATE DEZEX VS E TELESCOPE THAT LOOKS PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE WILL MEASURE Z = 1 TO 16 NICLEI WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE. WITH NO CHARGE RESOLUTION, WILL BE DETAINED AS COUNTS IN THE DEZDX BUT NOT IN THE E SENSOR. THE THIRD DETECTOR SYSTEM WILL BE A THREE-ELEVENT TELESCOPE WHOSE AXIS MAKES AN ANGLE OF 39 DEG WIT PRESPECT TO THE SPIN AXIS. THE MIDDLE ELEMENT WILL SE A CS I SCINTILLATOR WHILE THE OTHER TWO ELEMENTS WILL BE SGLID-STATE SENSORS. THE INSTRUMENT WILL RESPOND TO ELECTRONS BETWEEN 2 AND 12 MEY AND TO Z = 1 TO 30 NUCLEI IN THE ENERGY RANGE 20 TO 500 MEY/NUCLEON. FOR PARTICLES BELOW BO MEV. THIS INSTRUMENT WILL ACT AS A DEZDX DETECTOR. ABOVE 80 MEV. IT WILL ACT AS A SICIRECTIONAL TRIPLE CE/CX CETECTOR. FLUX DIRECTIONALITY INFORMATION WILL BE OBTAINED BY DIVIDING CERTAIN PORTIONS CF THE DATA FROM EACH CETECTOR INTO EIGHT ANGULAR SECTORS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSOC ID IMF-J -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI ~ S.J. BAME LCS ALAMOS SCI LAB LCS ALAMOS. NM
OI ~ J.R. ASBRIDGE LOS ALAMOS SCI LAB LUS ALAMOS. NM

## EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WILL BE USED TO STUCY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SCLAR WIND. MAGNET CSHEATH. AND MAGNETOTAIL. IONS AS HEAVY AS CAYGEN WILL BE RESCLVED WHEN THE SOLAR WIND TEMPERATURE IS LOW. ENERGY ANALYSIS WILL BE ACCOMPLISHED BY CHARGING THE FLATES TO KNOWN VOLTAGE LEVELS AND ALLCRING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. IN THE SOLAR WIND, FOSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SFACING, 15 PERCENT RESOLUTION) WILL BE STUDIEC. IN THE MAGNETOSHEATH, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING. 3 PERCENT RESOLUTION) AND FROM 200 EV TO 20 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING. 15 PERCENT RESOLUTION) WILL BE STUDIED. IN THE MAGNETOTALL. POSITIVE IONS FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING. 15 PERCENT RESCLUTION) AND FROM 100 EV TO 20 KEV (15 PERCENT RESOLUTION) WILL BE STUDIED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APERCVED.

NSSCC IC IMP-J -11

EXPERIMENT NAME- ELECTROSTATIC FIELDS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: 01=0THER INVESTIGATOR) GREENEELT. MD NA SA - GSFC AGGSON PI - T.L. GREENBELT. NO NASA-GSEC HEPPNER GI - J.P.

## EXPERIMENT BRIEF DESCRIPTION

A BLAXIAL ANTENNA SYSTEM WITH ELECTROMETERS TO MEASURE THE POTENTIAL DIFFERENCE BETWEEN THE TWO HALVES OF EACH ANTENNA WILL DETERMINE THE VECTOR ELECTRUSTATIC FIELD WITH A SENSITIVITY OF 0.1 MV FER METER. ONE ANTENNA WILL LIE ALONG THE SPACECRAFT SPIN AXIS AND THE OTHER WILL BE NORMAL TO THIS AXIS. MEASUREMENTS WILL BE MADE IN THE SCLAR WIND, IN THE TRANSITION REGION, AND IN THE GERMAGNETIC TAIL.

ON 12/18/72. THE SPACECRAFT MISSICN WAS APPRILYED.

NSSDC ID IMP-J -12 EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) ICWA CITY. IA U CE IOWA GURNETT PI - D.A. GREENEELT, MD NASA-GSEC AGGSON OI - Tale ICHA CITY. IA L OF TOWA PFEIFFER 01 - G.W.

## EXPERIMENT BRIEF CESCRIPTION

A WIDE-BANG RECEIVER WILL BE USED TO OBSERVE HIGH-RESCLUTION FREQUENCY-TIME SPECTRA, AND A SIX-CHANNEL NARROW-BAND RECEIVER WITH A VARIABLE CENTER FREQUENCY WILL BE USED TO OBSERVE WAVE CHARACTERISTICS. THE RECEIVERS WILL CHERATE FROM THREE ANTENNA SYSTEMS. THE FIRST SYSTEM WILL CONTAIN A PAIR OF LONG DIPOLE ANTENNAS (ONE, EXTENDABLE TO 400 FT, NORMAL TO THE SPACECRAFT SPIN AXIS AND THE OTHER ANTENNA, EXTENCABLE TO 20 FT, ALCNG THE SPIN AXIS) . THE SECOND SYSTEM WILL CONTAIN A BOOM-MOUNTED TRIAD CF ORTHOGONAL LOOP ANTENNAS. THE THIRD SYSTEM WILL CONSIST OF A BOOM-MOUNTED 20-IN. SPIN AXIS DIPOLE. THE MAGNETIC AND ELECTRIC FIELD INTENSITIES AND FREQUENCY SPECTRA, FOLARIZATION, AND DIRECTION OF ARRIVAL OF NATURALLY OCCURRING RADIC NOISE IN THE MAGNETOSPHERE WILL BE OBSERVED. PHENOMENA TO BE STUDIED APE THE TIME-SPACE DISTRIBUTION. CRIGIN, FREPAGATION, DISPERSION, AND OTHER CHARACTERISTICS OF RADIO NOISES OCCURRING ACROSS AND EN EITHER SIDE OF THE MAGNETOSPHERIC BOUNDARY REGION. THE FREQUENCY RANGE FOR ELECTRIC FIELDS WILL BE C.3 FZ TO 200 KHZ AND FOR MAGNETIC FIELDS. IT WILL BE 20 HZ TO 200 KHZ.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPRIVED.

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NESDC ID INDASAT SPACECRAFT COMMON NAME- INCIAN SCIENTIFIC SAT. ALTERNATE NAMES-

PLANNED LAUNCH DATE- 12/00/74 SPACECPART WEIGHT IN CREIT-300. KG

LAUNCH VEHICLE-LAUNCH SITE-

FUNDING AGENCY INDIA

ISRO

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC URBIT PERIOD- MIN
APDAPSIS- 600. KM ALT PERIAPSIS- 600. KM ALT INCLINATION-

DEG

SPACECRAFT PERSONNEL (PM=PRCJECT MANAGER, PS=FRCJECT SCIENTIST)
PM -- UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THE INDIAN SCIENTIFIC SATELLITE WILL BE THE FIRST SATELLITE WHOLLY DESIGNED AND FABRICATED IN INDIA. IT WILL BE LAUNCHED BY THE USSR AND WILL CARRY EXPERIMENTS COVERING THREE AREAS -- X-RAY ASTRONOMY, SOLAR NEUTRON AND GAMMA RAYS, AND ICHOSPHERIC PHYSICS. THE SATELLITE WILL BE SPIN STABILIZED AND WILL BE LAUNCHED INTO A NEAR-CIRCULAR ORBIT. THE NECESSARY GROUND TELEMETRY AND TELECOMMAND STATIONS WILL BE ESTABLISHED AT SRIHARIKOTA.

GN 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME - X-FAY ASTRONOMY

NESCO IC INDASAT-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL USE A NAI (TL) SCINTILLATOR AND A PROPORTIONAL COUNTER TO MEASURE X RAYS IN THE ENERGY RANGE 2 TO 100 KEV FROM BOTH CELESTIAL SOURCES AND COSMIC BACKGROUND.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME - SOLAR MELTRON AND GAMMA RAYS

NSSEC IE INCASAT-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETECT EMISSION OF ENERGETIC NEUTRONS FROM 10 TO 500 MEV AND GAMMA RAYS FROM 200 KEV TO 20 MEV ASSOCIATED WITH VIOLENT OUTBURSTS ON THE SUN.

DN 10/30/73. THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME- IGNOSPHERIC ELECTRON TRAP AND LV
CHAMBERS

NEEDC ID INDASAT-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT OPIER DESCRIPTION

THIS EXPERIMENT WILL USE AN ELECTRON TRAF TO MEASURE ELECTRON ENERGIES UP TO 100 EV. ALENG WITH UV CHAMBERS TO MENITOR THE SCATTERED LYMAN-ALPHA RADIATION AND DXYGEN EMISSIONS IN THE NIGHT SKY.

ON 10/30/73. THE SPACECRAFT MISSION WAS UNKNOWN.

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SPACECRAFT COMMON NAME- INTASAT INTA SATELLITE ALTERNATE NAMES-

NSSDC ID INTASAT

SPACECRAFT WEIGHT IN CREIT-PLANNED LAUNCH DATE- 07/00/75

LAUNCH SITE- VANCENBERG AFE. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

SPAIN UNITED STATES

CNIE-INTA NASA-DSS

PLANNED GREIT PARAMETERS

DRBIT TYPE- GEOCENTRIC APOAPSIS- 1000 . KM ALT

MIN ORBIT PERIOD-

FERIAPSIS- 1000 . KM ALT INCLINATION-

100. DEG

SPACE CRAFT PERSONNEL (PM=PROJECT MANAGER. FS=PROJECT SCIENTIST)

- M. L - M9 DURADU CNIE-INTA

YEFREJON: SPAIN

PS - L.S. MUNIOSGUREN CNIE-INTA

MACRIC. SPAIN GREENBELT. MD

JACKSON PS - J.E.

NASA-GSEC

### SPACECRAFT BRIEF DESCRIPTION

INTASAT. THE FIRST SPANISH SATELLITE. WILL EE A SMALL. MAGNETICALLY STABILIZED SPACECRAFT WHICH WILL CAPRY A BEACON EXPERIMENT FOR STUDY OF THE IGNUSPHERE. THE SPACECRAFT WILL BE A 12-SIDED RIGHT PRISM. 44.5 CM ACROSS OPPUSITE FLAT SIDES, AND 45 CM HIGH. THE ATTITUDE CONTROL MAGNET WITH DAMFING BARS WILL PROVIDE ALIGNMENT TO THE LOCAL MAGNETIC FIELD VECTOR TO PLUS OR MINUS 10 DEC WITHIN 10 DAYS OF LAUNCH. THE 18-V POWER SYSTEM WILL BE UPERATED BY 12 NICKEL-CACNIUM BATTERIES CHARGED BY SELAR CELLS ON THE SIDES OF THE SATELLITE. THE OREIT PLANNED WILL BE SUN-SYNCHRONOUS. WITH EQUATOR CRUSSING INITIALLY OCCURRING AT NOON AND MIDNIGHT LOCAL TIME. IT IS EXPECTED THAT MANY GROUND DESERVERS (37 PLAN OBSERVATIONS AS OF SEFTEMBER 1973) WILL USE THE EXPERIMENT FOR IONOSPHERIC STUDY. TELEMETRY WILL BE PROVIDED FOR MONITURING AND CONTROL OF SPACECRAFT CONDITION.

ON 10/30/73. THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERINENT NAME - ICHOSPHERIC EEACON

NESCO ID INTASAT-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: 01=01HER INVESTIGATOR) UNKNEWN F1 -UNKNOWN

EXPERIMENT BRIEF CESCRIPTION

THIS BEACCH EXPERIMENT WILL CONSIST OF A TWO-FREGLENCY (40.0100 AND 40.01025 MHZ) TRANSMITTER. THAT WILL CENTINUCUSLY RADIATE LINEARLY

POLARIZED. STAELE AND UNMODULATED SIGNALS AT A MINIMUM POWER LEVEL OF 200 MW. THE TWO-BEACON NONOFOLE ANTENNA. BNE BEACON FOR EACH FREQUENCY. WILL EXTENS FROM THE TOP AND BOTTOM OF THE SPACECRAFT ALONG THE SPACECRAFT AXIS. PRESENTLY, 37 EXPERIMENTERS IN 21 DIFFERENT COUNTRIES ARE PLANNING TO PARTICIPATE. AND ADDITIONAL PARTICIPATION IS EXPECTED. THE EXPERIMENTERS WILL CALCULATE TOTAL ELECTRON CONTENT ALONG THE PROPAGATION PATH FROM SATELLITE TO GROUND, AND WILL COSERVE IGNOSPHERIC IRREGULARITIES AND SCIATILLATIONS.

CN 10/30/73, THE SPACECRAFT MISSION WAS UNKNEWN.

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SPACECRAFT COMMON NAME- ISS

NSSCC IC ISS

ALTERNATE NAMES -

IGNOSPHERE SOUNDING SAT

SPACECRAFT WEIGHT IN CRBIT-

85 - KG

PLANNED LAUNCH DATE- 02/00/76 LAUNCH SITE- TANEGASTIMA. JAPAN

LAUNCH VEHICLE- NU

FUNDING AGENCY

JAPAN

NASDA

PLANNED ORBIT PARAMETERS

GREIT TYPE- GEOCENTRIC APCAFSIS- 1000.00 KM ALT

CRBIT PERICE-PEFIAPSIS- 1000.00 KN ALT

MIN

INCLINATION-

70 . DEG

SPACECHAFT PERSENNEL (PM=PhoJECT MANAGER, FS=FROJECT SCIENTIST)

FN - K. TAD PS - K. TAD

RRL RRL

TCKYC. JAFAN

TUKYC. JAPAN

### SPACECRAFT SHIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MACNETOSPHERIC STUDY. THE ISS COUPCTIVE WILL SE TO COSERVE THE WORLDWIDE DISTRIBUTION OF THE VIRTUAL RANGE VS THE FREQUENCY (OBTAIN ICNOGRAMS) OF THE TOPSIDE ICNOSPHERE. AND TO OBSERVE THE WORLDWIDE DISTRIBUTION OF RACIO NOISE. THE IDNOSPHERIC COSERVATION WILL BE IN THE GENERAL RANGE OF 1 TO 15 MHZ. SEVERAL SUPPLEMENTAL GESERVATIONS OF IN SITU PLASMA CHARACTERISTICS WILL ALSO BE CONDUCTED ALONG THE SATELLITE ORBIT. THESE OBSERVATIONS WILL INCLUDE DENSITY AND TEMPERATURE OF ELECTRONS. IONS MEASURED BY A RETARDING POTENTIAL THAP, AN ION MASS SPECTROMETER. AND DESERVATION OF THE EARTH'S MAGNETIC FIELD. THE SATELLITE WILL BE SPIN STABILIZED WITH ITS SEIN AXIS NORMAL TO THE ECLIPTIC PLANE.

ON 12/16/72, THE SPACECRAFT MISSION WAS AFFRONED.

EXPERIMENT NAME - SWEEP FREQUENCY SOUNDER

NSSDC ID ISS

-01

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR: CIECTER INVESTIGATOR)

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT'S OBJECTIVE WILL HE TO OBTAIN A WORLDWIDE DISTRIBUTION OF THE VIPTUAL FRIGHT VS. FREQUENCY CHARACTERISTICS OF THE TOPSIDE

I GNGSPHERE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RACIO NO ISE

NSSDC ID ISS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)

EXPERIMENT BRIEF DESCRIPTION THIS EXPERIMENT'S OBJECTIVE WILL BE TO OBTAIN A WORLDWIDE DISTRIBUTION OF RACIO NOISE CAUSED BY ATMOSPHERICS.

ON 12/18/72. THE SPACECRAFT WISSICH WAS APPROVED.

EXPERIMENT NAME- RETARDING POTENTIAL PROBE

NSSCC IC ISS -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR) TORYC. JAFAN RRL M IY AZ AK I PI - S.

EXPERIMENT ERIEF DESCRIPTION

NO INFORMATION IS PRESENTLY AVAILABLE ON THIS PROBE BUT IT IS FROBABLY AN ION TRAP. SUCH TRAPS USUALLY USE ONE OR MORE SCREEN GRIDS MOUNTED IN FRONT OF A COLLECTOR. THE SCREENS WILL HAVE A VARIABLE VOLTAGE PATTERN APPLIED TO PERMIT EITHER ELECTRON OR ION CURRENTS. FOR A GIVEN SCREEN VOLTAGE. A VOLTAGE PROFILE FROVIDED TO THE COLLECTOR WILL PRODUCE A CURRENT/VOLTAGE PROFILE. ANALYSIS OF THIS PROFILE CAN FROVICE TEMPERATURE. COMPOSITION. AND CENSITY DATA FOR IONS AND/OR ELECTRONS.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION MASS SPECTROMETER

-04 NESCC ID ISS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) TCKYO: JAPAN RRL

EXPERIMENT BRIEF DESCRIPTION

BEING FLOWN TO CONTRIBUTE TO THE SUPPLEMENTAL CESERVATIONS OF IN SITU PLASMA CHARACTERISTICS, THIS EXPERIMENT WILL MEASURE THE AMBIENT ICN CONCENTRATIONS WITH AN ION MASS SPECTROMETER USED AS THE SENSOR.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- ITOS-F ALTERNATE NAMES-

NSSOC ID ITOS-F

PLANNED LAUNCH CATE- 10/18/73

SPACECRAFT WEIGHT IN CREIT-

LAUNCH SITE- VANCENBERG AFE, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NOAA-NESS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 115.2 MIN APGAPSIS- 1460.00 KM ALT

PERIAPSIS- 1460.00 KW ALT INCLINATION-

102. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST) PM - J.

SARGENT PS - I.L. GOLDEERG NASA-GSEC

GREENBELT, MD

NASA-GSFC GREENEELT, MD

## SPACECRAFT ERIEF DESCRIPTION

ITOS-F IS ONE IN A SERIES OF IMPROVED TIROS-M TYPE SATELLITES THAT WILL BE LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE ITOS SYSTEM. THE PRIMARY OBJECTIVE OF THE ITOS-F METEOROLOGICAL SATELLITE WILL BE TO PROVIDE GLOBAL DAYTIME AND NIGHTTIME DIRECT READOUT CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONOUS SPACECRAFT WILL ALSO BE CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA OF SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAFE RECORDER MODE. A SECONDARY OBJECTIVE WILL BE TO GETAIN GLOBAL SOLAR PROTON FLUX DATA ON A ROUTINE DAILY BASIS. THE PRIMARY SENSORS WILL CONSIST OF A VERY HIGH RESCLUTION RADIOMETER (VHRR). A VERTICAL TEMPERATURE FROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR, VTPR, AND SR WILL BE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT WILL MEASURE 1 BY 1 BY 1.2 M. THE SATELLITE WILL BE EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WILL BE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT IS ACHIEVED. EACH PANEL WILL MEASURE OVER 4.2 M IN LENGTH WHEN UNFOLDED AND WILL BE COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE ITOS DYNAMICS AND ATTITUDE CONTROL SYSTEM WILL MAINTAIN DESIRED SPACECRAFT CRIENTATION THROUGH GYRCSCOPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH DRIENTATION OF THE SATELLITE BODY WILL BE MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER CABIT WILL PROVIDE THE DESIRED \*EARTH LOCKING. ATTITUCE. MINOR ADJUSTMENTS IN ATTITUDE AND CRIENTATION WILL BE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE MOMENTUM FLYWHEEL.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - SOLAR PROTON MONITOR

NSSDC ID ITOS-F -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=OTHER INVESTIGATOR) PI - C.O. COSTROM AFPLIED PHYSICS LAB SILVER SPRING. MD

### EXPERIMENT BRIEF CESCRIPTION

THREE SOLID-STATE DETECTORS WILL MONITOR THE CHNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE 10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID-STATE DETECTORS WILL EACH MEASURE DIRECTIONAL FLUXES OF PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS). PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV. AND ALFHA PARTICLES BETWEEN

12.5 AND 32 MEV. IN THE POLAR CAP REGION WHICH IS OF THE GREATEST INTEREST. THE TELESCOPES WILL VIEW PARALLEL TO. AND PERPENDICULAR TO. THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID-STATE DETECTOR WILL MEASURE DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR WILL LOOK IN A DIRECTION PERPENDICULAR TO THE ORBIT PLANE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- SCANNING RACIOMETER (SR)

NESDC ID ITCS-F -02

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR, CI=(THER INVESTIGATOR)
PI + NESS STAFF NOAA-NESS SUITLAND, ND.

## EXPERIMENT BRIEF DESCRIPTION

THE ITOS-F SCANNING RADIOMETER (SR) SUBSYSTEM WILL CONSIST OF TWO SCANNING RADIOMETERS. A CUAL SR PROCESSOR. AND TWO SR RECORDERS. THIS SUBSYSTEM WILL PERMIT THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND. THE SEA. OR CLOUD TOPS VIEWED BY THE RACICMETER. THE RADICMETER WILL MEASURE REFLECTED RADIATION FROM THE EARTH/ATMOSPHERE SYSTEM IN THE 0.52- TO 0.73-MICRON CHANNEL DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON CHANNEL DURING THE DAY AND NIGHT. UNLIKE A CAMERA. THE SR WILL NOT TAKE A PICTURE BUT INSTEAD WILL FORM AN IMAGE USING A CONTINUOUSLY ROTATING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENCICULAR TO THE SATELLITE'S CROITAL FATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSES ALONG ITS CRBITAL PATH. EACH RETATION OF THE MIRROR WILL PROVIDE ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR WILL BE PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) CAN BE STORED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA CAN ALSO BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. CNCE THE SIGNAL IS RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WILL BE FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN IS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. FROM A PLANNED ALTITUDE OF 1460 KM. THE RACIOMETER WILL HAVE A GROUND RESOLUTION OF APPROXIMATELY 4 KM AT NADIR AND WILL BE CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF +4 AND -1 DEG K. RESPECTIVELY. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITCS-C. -E. AND -G.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR) NSSDC ID ITOS-F -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CT+ER INVESTIGATOR)
PI - NESS STAFF NCAA-NESS SUITLANG. MD.

#### EXPERIMENT ERIEF CESCRIPTION

THE ITOS-F VERY HIGH RESOLUTION RADIOMETER (VHRR) EXPERIMENT IS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN CAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT CAN BE PROGRAMMED TO FECORD UP TO S MIN OF DATA FOR REMOTE AREAS WHERE NO CDA

STATION IS WITHIN RANGE OF THE SPACECRAFT, WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT COA STATION THAT THE SPACECRAFT PASSES. THE EXPERIMENT WILL INCLUDE TWO SCANNING RACICMETERS. A MAGNETIC TAPE RECORDER. AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VHRR WILL OPERATE SIMILARLY TO THE SCANNING RACIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NACIR). ONE VHRR CHANNEL WILL MEASURE REFLECTED VISUAL RACIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE BETWEEN 0.6 AND 0.7 MICRON. THIS WILL PROVIDE MORE CONTRAST THAN THE SR BETWEEN THE EARTH AND CLOUDS BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL WILL MEASURE INFRARED RADIATION EMITTED FROM THE EARTH. SEA. AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTFAL REGION WILL PERMIT BOTH DAYTIME AND NIGHTTIME RADIANCE MEASUREMENTS. THE VHRR WILL FORM AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR. EXCEPT THAT BOTH RADIOMETERS WILL OPERATE SIMULTANEOUSLY. AS THE SATELLITE FROCEEDS IN ITS ORBIT, THE 400-RPM REVOLVING MIRRORS WILL SCAN THE EARTH'S SURFACE 180 DEG GUT OF PHASE (ONE MIRROR AT A TIME) AND PERFENDICULAR TO THE CREIT PATH. THE VISIBLE AND INFRARED DATA WILL BE TIME-MULTIPLEXED SO THAT THE SCAN OF THE INFRARED CHANNEL WILL BE TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIELE CHANNEL. THIS PROCESS WILL BE REPEATED 400 TIMES PER MINUTE (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADICMETERS FAILS, THE SYSTEM WILL STILL BE CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED RACIATION USING UNLY THE REMAINING RADICMETER. ALL CREFATIONAL DATA FROM THIS EXPERIMENT WILL BE HANCLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA, IDENTICAL EXPERIMENTS WILL BE FLEWN ON ITOS-O, -E. AND -G.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VERTICAL TEMPERATURE PROFILE RADIONETER INSSECTED ITOS-F -04 (VTFR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR)
PI - NESS STAFF NCAA-NESS SLITLAND. MD.

### EXPERIMENT ERIEF CESCRIPTION

THE ITOS-F VERTICAL TEMPERATURE PROFILE RADICMETER (VTPR) WILL SENSE THE RACIANT ENERGY FROM ATMOSPHERIC CARBON DIOXIDE IN SIX NARROW SPECTRAL REGIONS CENTERED AT 15.0. 14.8, 14.4, 14.1, 13.8. AND 13.4 MICRONS. THE GROSS ATMOSPHERIC WATER VAPER CONTENT WILL BE DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WILL ALSO BE TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLOUDTOP TEMPERATURES. THE VTPR WILL CONSIST OF AN OPTICAL SYSTEM, DETECTOR AND ASSOCIATED ELECTRONICS, AND A SCANNING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S CRBITAL PATH. THE GROUND AREA COVERED BY CHE SAMPLE OF DATA WILL BE APPROXIMATELY 50 BY 50 KM. AS EACH AREA IS SCANNED. THE OPTICAL SYSTEM WILL COLLECT. FILTER, AND DETECT THE RADIATION FROM THE EARTH AND SEPARATE IT INTO THE EIGHT SPECTRAL INTERVALS. THE RADICMETER WILL OPERATE CONTINUOUSLY, TAKING MEASUREMENTS OVER EVERY PART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WILL BE RECORDED THROUGHOUT THE CRBIT AND PLAYED BACK UPON COMMAND WHEN THE SATELLITE IS WITHIN COMMUNICATION RANGE OF A COMMAND AND DATA ACQUISITION STATION. GROUND PERSONNEL WILL USE THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. ALL CPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAM AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER. ASHEVILLE. NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D. -E. AND -G.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- ITOS-G ALTERNATE NAMES-

NEEDC ID ITCS-G

PLANNED LAUNCH DATE- 07/00/75 SPACECRAFT WEIGHT IN ORBIT- 409. KG

LAUNCH SITE- VANCENEERG AFB. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NOAA-NESS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- 115.2 MIN

APUAPS IS - 1460.00 KM ALT PERIAPSIS - 1460.00 KM ALT INCLINATION - 102. DEG

SPACECRAFT PERSONNEL (PM#PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J. SARGENT

NASA-GSFC NASA-GSFC

GREENEELT. MD

PS - 1.L. GOLDEERG

GREENBELT, NO

### SPACECRAFT ERIEF DESCRIPTION

ITUSHG WILL BE ONE IN A SERIES OF IMPROVED TIROSHM TYPE SATELLITES THAT WILL BE LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPACILITY OF THE ITOS SYSTEM. THE PRIMARY GOJECTIVES OF THE ITUS-G METEOROLOGICAL SATELLITE WILL BE TO PROVIDE GLOBAL DAYTIME AND NIGHTTIME DIRECT READOUT CLOUDCOVER DATA ON A DAILY EASIS. THE SUN-SYNCHRUNDUS SPACECRAFT WILL ALSO BE CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLLUDCOVER DATA OF SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAPE RECORDER MODE. A SECONDARY OBJECTIVE WILL BE TO CETAIN GLOBAL SOLAR PROTON DENSITY DATA ON A ROUTINE DAILY BASIS. THE FRIMARY SENSORS WILL CONSIST OF A VERY HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE FROFILE RADIOMETER (VTPR), AND A SCANNING RADIGNETER (SR). THE VHRR, VTPR, AND SR WILL BE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT WILL MEASURE 1 BY 1 BY 1.2 M. THE SATELLITE WILL BE EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WILL BE FOLDED CUPING LAUNCH AND DEPLOYED AFTER CREIT IS ACHIEVED. EACH PANEL WILL MEASURE CVER 4.2 M IN LENGTH WHEN UNFULDED AND WILL BE COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE ITES DYNAMICS AND ATTITUDE CONTROL SYSTEM WILL MAINTAIN DESIRED SPACECRAFT CRIENTATION THROUGH GYRCS COPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WILL BE MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SC THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER ORBIT WILL FROVIDE THE DESIRED \*EARTH LUCKING ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WILL BE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE MOMENTUM FLYWHEEL

ON 12/18/72, THE SPACECRAFT MISSILN WAS APPROVED.

EXPERIMENT NAME- SOLAR PROTON MONITOR

NSSCC ID ITCS-G -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) PI.- C.O. BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MD

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONTINUE THE ITOS SERIES OF JHU/APL EXPERIMENTS. WHICH ARE ALL TO BE THE SAME THROUGH ITCS-F. THREE SCLIC-STATE DETECTORS WILL MONITOR THE OMNICIRECTIONAL FLUXES OF SCLAR PROTONS WITH ENERGIES ABOVE 10.30. AND 60 MEV. RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID-STATE DETECTORS WILL EACH MEASURE DIRECTIONAL FLUXES OF FROTONS EETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS). PROTONS BETWEEN 3.2 AND 60 MEV. FROTONS ABOVE 60 MEV. AND ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP REGION WHICH IS OF THE GREATEST INTEREST. THE TELESCOPES WILL VIEW FARALLEL TO. AND PERPENDICULAR TO. THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID STATE DETECTOR WILL MEASURE DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR WILL LOCK IN A DIRECTION PERPENDICULAR TO THE ORBIT PLANE. THE EXPERIMENTER HAS NOT YET DETERMINED WHETHER MINOR CHANGES WILL BE IMPLEMENTED FOR THIS ITOS-G EXPERIMENT.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCANNING RADIOMETER (SR)

MESCC IC ITCS-6 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

### EXPERIMENT BRIEF DESCRIPTION

THE ITOSEG SCANNING RADIOMETER (SR) SUBSYSTEM WILL CONSIST OF TWO SCANNING RADIOMETERS, A DUAL SE PROCESSEE, AND TWO SE RECORDERS. THIS SUBSYSTEM WILL FERMIT THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND. THE SEA. OR CLOUD TOPS VIEWED BY THE RADICMETER. THE RADICMETER WILL MEASURE REFLECTED RADIATION FROM THE EARTH/ATMOSPHERE SYSTEM IN THE 0.52- TO 0.73-MICRON BAND DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON REGION DURING THE DAY AND NIGHT. UNLIKE A CAMERA. THE SR WILL NUT TAKE A PICTURE BUT INSTEAD WILL FORM AN IMAGE USING A CONTINUOUSLY FOTATING MIRRER. THE MIRRER WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S CABITAL FATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSES ALONG ITS ORBITAL PATH. EACH ROTATION OF THE MIRRUR WILL PROVIDE ONE SCAN LINE OF PICTURE. RACIATION COLLECTED BY THE MIRRUR WILL BE FASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) CAN BE STURED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5 NHZ) TO AN ACQUISITION STATION. THE DATA CAN ALSO BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. DNCE THE SIGNAL IS RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WILL BE FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN IS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. FROM A PLANNED ALTITUDE OF 1460 KM, THE RADIOMETER WILL HAVE A GROUND RESOLUTION OF APPROXIMATELY & KM AT MADIR AND WILL BE CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF +4 AND -1 DEG K. RESPECTIVELY. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CARCLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON-1705-D. -E. AND -F.

ON 12/18/72. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- VERY HIGH RESCLUTION RADIOMETER (VHRF) - NSSC 10 ITOS-G -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) SUITLAND, MD. NESS STAFF NOAA-NESS

## EXPERIMENT ERIEF DESCRIPTION

THE VERY FIGH RESOLUTION RADIOMETER (VHRR) EXPERIMENT IS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE BARTH. SEA. AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LCCAL WEATHER FORECASTING. THE SPACECRAFT CAN BE PROGRAMMED TO RECORD UP TO 9 MIN OF CATA FOR REMOTE AREAS WHERE NO COA STATION IS WITHIN RANGE CF THE SPACECRAFT. WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT COA STATION THAT THE SPACECRAFT PASSES. THE EXPERIMENT WILL INCLUDE TWO SCANNING RADIOMETERS. A MAGNETIC TAPE RECORDER, AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VERR WILL OPERATE SIMILARLY TO THE SCANNING RACIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NADIR). ONE CHANNEL WILL MEASURE REFLECTED VISUAL RADIATION FROM CLOUD TOFS IN THE LIMITED SPECTRAL RANGE BETWEEN 0.6 AND 0.7 MICRON. THIS WILL PROVIDE MORE CONTRAST THAN THE SR BETWEEN THE EARTH AND CLOUDS BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL WILL MEASURE INFRARED RACIATION EMITTED FROM THE EARTH. SEA. AND CLOUD TOPS IN THE 10.5- TO 12.5-MICHCH REGION. THIS SPECTRAL REGION WILL PERMIT BOTH DAYTIME AND NIGHTTIME RADIANCE MEASUREMENTS. THE VHRR WILL FORM AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR. EXCEPT THAT ECTH RACIOMETERS WILL CPERATE SIMILTANECUSLY. AS THE SATELLITE PROCEEDS IN ITS ORBIT, TWO 400-RPM REVOLVING MIRRORS WILL SCAN THE EARTH'S SURFACE 180 DEG OUT OF PHASE (ONE MIRROR AT A TIME) IN A LINE PERPENCICULAR TO THE OREIT PATH. THE VISIELE AND INFRARED DATA WILL BE TIME-MULTIPLEXED SO THAT THE SCAN OF THE INFRARED CHANNEL WILL BE TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WILL BE REPEATED 400 TIMES PER MINUTE (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADIOMETERS FAILS, THE SYSTEM WILL STILL BE CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED FACIATION USING CALY THE REMAINING RADICMETER. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER. ASHEVILLE, MORTH CAROLINA, IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITCS+E. -F, AND -G.

UN 12/18/72. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME+ VERTICAL TEMPERATURE PROFILE PADIOMETER - NSSCC ID ITOS-G -04 (VIPR)

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR: CIECTHER INVESTIGATOR) SLITLAND. MD. NESS STAFF NOAA-NESS PI -

### EXPERIMENT SHIEF DESCRIPTION

THE ITOS-6 VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR) WILL SENSE THE RADIANT ENERGY FROM ATMOSPHERIC CARBON DIOXIDE IN SIX NARROW SPECTRAL REGIUNS CENTERED AT 15.0, 14.8, 14.4, 14.1, 13.8, AND 13.4 MICRONS. THE GRUSS ATMOSPHERIC WATER VAPOR CONTENT WILL BE DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WILL ALSO BE TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLCUCTOP TEMFERATURES. THE VTPR WILL CONSIST OF AN OPTICAL SYSTEM. DETECTOR AND ASSOCIATED ELECTRONICS. AND A SCANNING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE FEFFENDICULAR TO THE SATELLITE'S ORBITAL PATH. AS EACH AREA IS SCANNED, THE OPTICAL SYSTEM

WILL COLLECT, FILTER, AND DETECT THE RADIATION FROM THE EARTH AND SEPARATE IT INTO THE EIGHT SPECTRAL INTERVALS. THE GROUND AREA COVERED BY ONE SAMPLE OF DATA WILL BE APPROXIMATELY SO BY SO KM. THE RADIOMETER WILL OPERATE CONTINUOUSLY. TAKING MEASUREMENTS OVER EVERY PART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WILL BE RECORDED THROUGHOUT THE CREIT AND WILL BE PLAYED BACK UPON COMMAND WHEN THE SATELLITE IS WITHIN COMMUNICATION FANGE OF A COMMAND AND DATA ACQUISITION STATION. GROUND PERSONNEL WILL USE THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER. ASHEVILLE. NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITCS-C. -E. AND -F.

ON 12/18/72. THE SPACECRAFT MISSICH WAS AFFRONED.

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SPACECRAFT COMMON NAME- ITOS-H ALTERNATE NAMES-

NSSCC IC ITOS-F

PLANNED LAUNCH DATE- 12/00/76

SPACECRAFT WEIGHT IN DRBIT-

633 KG

LAUNCH SITE- VANCENBERG AFE, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NOAA-NESS

UNITED STATES

NASA-CSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERICO- 120. WIN

APGAPS 15 - 1678.00 KM ALT PERIAPSIS - 1578.00 KN ALT INCLINATION-

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER + PS=FREJECT SCIENTIST)

PM - R.A.

STAMPFL

NASA-GSEC

GREENBELT, MD

PS - W. SEFNK

NASA-GSEC

GREENEELT. NO

## SFACECRAFT EPIEF CESCRIPTION

ITOS-H WILL BE THE SECOND IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADICMETER (AVERR) FOR CBSERVING DAYTIME AND NIGHTIME GLOBAL CLOUD COVER. AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR CETAINING TEMPERATURE. WATER VAPOR. AND OZINE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM). WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH. AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS). WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS NETECROLOGICAL DATA RECEIVED FROM FREE FLOATING BALLOONS AND OCEAN BLOYS DISTRIBUTED AROUND THE GLOSE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN FARTH-FOINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

NSSDC ID ITCS-H -01

EXPERIMENT NAME- ADVANCED VERY FIGH RESOLUTION RACIOMETER (AVER)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=(THEF INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SLITLAND, MO

## EXPERIMENT BRIEF DESCRIPTION

THE ITOS-H ADVANCED VERY HIGH RESCLUTION RACICMETER (AVHRR) WILL BE CAPABLE OF PROVICING GLOBAL DAYTIME AND NIGHTTIME EARTH CLCUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL CPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE). CHANNEL 2 - 0.75 TO 1.00 MICRON (NEAR IR). CHANNEL 3 - 10.5 TO 12.5 MICRONS (IR WINDOW). AND CHANNEL 4 - 6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE. NEAR IR. AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS -- ABOUT 4 KM AT NACIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING CF AN AMFLIFIER. AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-I AND -J.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SCUNDER (TOVS)

NSSDC IC ITOS-+ -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLANC, MC.
OI - UNKNOWN METEOROLOGICAL OFFICE LONDON, ENGLAND

## EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN CN ITOS-H IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE. WATER VAPOR. AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY CONSISTS OF TWO CPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION. CHANNEL 2 - THE S.E-MICRON OZBRE EARD, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION. EIGHT CHANNELS IN THE 15-MICRON CARBON CLOXIDE BAND+ AND THREE CHANNELS IN THE 18- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEDUS CARBON DIQXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO FROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S CREITAL MOTION WILL PROVICE SCANNING IN THE URTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SCUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART. AS COMPARED TO THE 900-KM SEFARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMEUS 4. VERTICAL PROFILES OF TEMPERATURE, DZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RACIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNICLES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE CZGNE WILL BE MEASURED TO WITHIN FLUS OR MINUS 0.01 CM. THE ITOS-I TOVS WILL FROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CAREEN DIDXIDE BANG AND THE CTHER A MICREMAVE DEVICE TO MEASURE

RADIATION IN THE 5.5-MM DXYGEN BAND.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - DATA COLLECTION AND PLATFORM LOCATION NSSDC 10 ITOS-H -03
SYSTEM (DCS)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI + UNKNOWN NASA-GSFC GREENEELT, MD

#### EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARF). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUDYS. OTHER SATELLITES. AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE CESERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MCVING BALLOGNS. THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLDONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANGLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (THERLE) TO BE FLOWN ON NIMEUS-F.

ON 12/18/72. THE SPACECRAFT MISSIGN WAS APPRIVED.

EXPERIMENT NAME - SPACE ENVIRONMENTAL MONITOR (SEM)

NESDC ID ITES-H -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - W. SHENK NASA-GSFC GREENBELT, MD

### EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 6.6 MEV), (2) FROTONS IN THE RANGES 400 TO 600 AND 600 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALFHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5) ALFHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALFHA PARTICLES ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV, OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITORED.

ON 12/18/72. THE SPACECRAFT MISSIGN WAS APPRIVED.

NEEDC ID ITCS-I

SPACECRAFT CCMMCN NAME- ITOS-I ALTERNATE NAMES-

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN ORBIT- 633. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES NOAA-NESS UNITED STATES NASA-CSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC URBIT PERICO- 120. MIN
APOAPSIS- 1678.00 KM ALT PERIAPSIS- 1578.00 KM ALT INCLINATION- 103. DEG

SPACECRAFT PERSONNEL (FM≅FROJECT MANAGER. PS≅FRCJECT SCIENTIST)

PM - R.A. STAMPFL NASA-GSFC GREENBELT. MD

PS - W.E. SHENK NASA-GSFC GREENEELT. MC

## SPACECRAFT BRIEF DESCRIPTION

ITCS-I WILL BE THE THIRD IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RACIOMETER (AVHRR) FOR CBSERVING DAYTINE AND NIGHTTIME GLOBAL CLOUD COVER AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR CETAINING TEMPERATURE. WATER VAPOR. AND DZONE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM). WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METECROLOGICAL DATA RECEIVED FROM FREE-FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL EE AELE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OF MINUS 1 CEG IN ALL THREE AXES. WITH MOTICA FATES OF LESS THAN 0.035 DEG/SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ACVANCED VERY FIGH RESOLUTION RADIOMETER (AVER)

NSSCC ID ITGS-I -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SLITLAND. MD

#### EXPERIMENT BRIEF DESCRIPTION

THE ITDS-I ADVANCED VERY HIGH RESCLUTION RACICMETER (AVERR) WILL BE CAPABLE OF PROVICING GLOBAL DAYTIME AND NIGHTIME EARTH CLCUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL CPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTFAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE). CHANNEL 2 - 0.75 TO 1.00 MICRON (NEAR IR). CHANNEL 3 - 10.5 TO 12.5 MICRONS (IR WINDOW). AND CHANNEL 4 - 6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE. NEAR IR. AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF

THE WATER VAPOR CHANNEL WILL BE SCHEWHAT LESS. ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER. AN ANALOG-TO-CIGITAL CONVERTER. AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H AND -J.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER NESDC ID ITCS-I -02 (TCVS)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NCAA-NESS SUITLAND, MD
OI - UNKNOWN METEUROLOGICAL OFFICE LUNCON, ENGLAND

#### EXPERIMENT ERIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-I IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE. WATER VAPOR, AND OZONE EY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.6-MICRON OZONE BAND. CHANNEL 3 - THE 11.1-MICRON WINCOW REGION. EIGHT CHANNELS IN THE 15-MICRON CARBON DICKIDE BAND, AND THREE CHANNELS IN THE 18- TO EC-MICRON ROTATIONAL MATER VAFOR BANC. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUELE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN. WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLUSE AS 400 KM APART. AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDEC WITH THE SIRS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE. AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 ME AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 FERCENT, WHILE THE OZONE WILL BE. MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE IN THE 5.5-MM UXYGEN BAND.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - DATA COLLECTION AND PLATFORM LOCATION NSSCO IC ITOS-1 -03
SYSTEM (DCS)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - UNKNOWN NASA-GSFC GEFENELT, MO

## EXPERIMENT BRIEF DESCRIPTION

THE CATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METECROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED

GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (COA) STATION. FOR THE FREE-MOVING BALLOONS. THE DOPPLER FREGUENCY SHIFT OF THE TRANSMITTER WILL BE CESERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320+KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS FER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE ELILT WITH A REACCUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOFED DOS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM. WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMEUS-F.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SPACE ENVIRONMENTAL MONITOR (SEM)

NSSDC IC ITOS-I -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS RETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 6.6 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO 1000 MEV. (3) PROTONS ABOVE 1000 MEV. (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5) ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALFHA PARTICLES ABOVE 600 MEV. AND (7) ELECTRONS ABOVE 250 KEV. CMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITCRED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- ITOS-J ALTERNATE NAMES- NEEDC ID ITCS-J

PLANNED LAUNCH DATE- 12/00/79 SPACECRAFT WEIGHT IN BREIT- 6

LAUNCH SITE- VANCENEERG AFE, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES NASA-CSS UNITED STATES NDAA-NESS

PLANNED ORBIT FARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 120. MIN
APCAPSIS- 1678.0C KM ALT PERIAPSIS- 1678.0C KM ALT INCLINATION- 103. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.A. STAMPFL PS - W.E. SHENK

NASA-GSFC NASA-GSFC GREENEELT. NO GREENEELT. MD

## SPACECRAFT BRIEF DESCRIPTION

ITOS-J WILL 66 THE FOURTH IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE FLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY FIGH RESOLUTION RADIOMETER (AVERE) FOR DESERVING DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE. WATER VAPOR. AND DZONE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH, AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL FRECESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METECROLOGICAL DATA RECEIVED FROM FREE FLOATING BALLOOMS AND OCEAN BUDYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 CEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ADVANCED VERY FIGH RESOLUTION RACIOMETER (AVHRR)

NSSDC ID ITCS-J -01

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR)
PI - NESS STAFF NCAA-NESS SUITLAND. MD.

# EXPERIMENT ERIEF DESCRIPTION

THE ITOS-J ADVANCED VERY FIGH RESOLUTION RACIOMETER (AVHRR) WILL BE CAPABLE OF PRUVICING GLOBAL DAYTIME AND NIGHTIME EARTH CLOUDCOVER PICTURES ON A REGULAR CAILY EASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAFE RECORDER MCDES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - C.S TO 0.7 MICHON (VISIBLE), CHANNEL 2 - 0.75 TO 1.00 MICHON (NEAR IR). CHANNEL 3 - 10.6 TO 12.5 MICHONS (IR WINDOW), AND CHANNEL 4 - 6.5 TO 7.0 MICHONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS. ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER. AN ANALOG-TO-CIGITAL CONVERTER, AND UTHER AUXILIARY ELECTRONICS. ICENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H AND -I.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIRGS OPERATIONAL VERTICAL SCUNDER (TOVS)

10- L-2011 31 30224

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=(THER INVESTIGATOR)
PI - NESS STAFF NGAA-NESS SLITTAND. NO.

PI - NESS STAFF NGAA-NESS SLITLAND, MD.

DI - UNKNOWN METECFOLOGICAL OFFICE LONDON, ENGLAND

## EXPERIMENT BRIEF DESCRIPTION

THE TIPOS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-J IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE,

WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMUSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. LNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.6-MICRON CZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINCOW REGION. EIGHT CHANNELS IN THE 15-MICRON CARBON DICKIDE BAND. AND THREE CHANNELS IN THE 18+ TO 3C-MICHON ROTATIONAL WATER VAFOR HAND. THE SECOND UNIT WILL HAVE THREE CHANNELS CREEATING AT 14.97 MICRONS USING SELECTIVE ABSCRPTIEN BY PASSING THE INCOMING FADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIGNICE AT DIFFERENT FRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE FLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S CREITAL MCTICN WILL PROVICE SCANNING IN THE BRITHOGONAL DIRECTION. THE DESIGN WILL ALLOW SCUNDINGS TO BE TAKEN AS CLUSE AS 400 KM APART. AS COMPARED TO THE 900-KM SEFAFATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMELS 4. VERTICAL FROFILES OF TEMPERATURE, CZONE, AND WATER VAPOR WILL SE CRIAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 ME AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE DZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS C.O. CM. THE TOVE WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS. ONE TO MEASURE INTERVALS IN THE 4.3-MICREN CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE 5.5-MM UXYGEN BANC.

ON 12/18/72, THE SPACECRAFT WISSICH WAS APPROVED.

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION NSSDC ID ITOS-J -03
SYSTEM (DCS)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR)
PI - UNKNOWN NASA-GSFC GREENBELT. ND

#### EXPERIMENT EPIEF DESCRIPTION

THE DATA CLLLECTION AND PLATFORM LECATION SYSTEM (ECS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GUDBAL ATMOSPHERIC RESEARCH PROGRAM (GARF). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METECROLOGICAL DESERVATIONS FROM FREE-FLOATING BALLOCKS, OCEAN BUDYS. CTHER SATELLITES, AND FIXED GROUND-BASED SEASOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE CESERVATIONS FROM THESE RANDOMLY LOCATED SCURCES WILL BE GREATIZED ON BUARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-NEVING BALLCONS. THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE CESERVEC TO CALCULATE THE LOCATION OF THE BALLCONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL RE STOREC IN A 320-KB SCLIC-STATE ELFFER MEMCRY. THE EUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER DRBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A REACCUT CAPABILITY OF 0.6 KES AS WELL AS AN 8-KBS CAFABILITY FOR DATA TRANSMISSION TO A CUA STATION. THE GSEC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROFICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

GN 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

C'

EXPERIMENT NAME - SPACE ENVIRONMENTAL MONITOR (SEM)
 ASSDO ID ITOS+J -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=(THER INVESTIGATOR)

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEY (INTERVAL THRESHOLDS OF 0.15. 0.30. 0.60. 1.5. AND 6.6 MEV), (2) FROTONS IN THE RANGES 400 TO 500 AND 500 TO 1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 NEV (INTERVAL THRESPOLDS OF 0.60. 0.90, 1.4. 3.5. AND 11 MEV). (5) ALPHA PARTICLES BETWEEN 330 AND 500 MEV, (f) ALPHA PARTICLES ABOVE 600 MEV. AND (7) ELECTRONS ABOVE RED KEY. CHNIDIRECTIONAL FLUXES OF FROTONS ABOVE 10. 30. AND 60 NEV WILL ALSO BE MONITORED.

ON 12/18/72, THE SPACECRAFT MISSICH WAS APPREVED.

SPACECRAFT COMMON NAME- LACEDS

ALTERNATE NAMES-LASER GEODYNAMIC SAT. NESDC ID LAGEGS

PLANNED LAUNCH DATE- 00/00/76

SPACECRAFT WEIGHT IN CREIT-

MIN

682 • KG

LAUNCH SITE- VANDENEERG AFB. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NASA-DA

PLANNED ORBIT PARAMETERS

CREIT TYPE- GEDCENTRIC

ORBIT PERICO-

APOAPSIS- 3700. KM ALT PERIAPSIS- 3700 . KM ALT

INCLINATION-50. DEG

SPACECRAFT PERSONNEL (PMEPROJECT MANAGER, PSEPROJECT SCIENTIST) PM - R. DILLER NASA HEADQUARTERS WASHINGTON. DC

## SPACECRAFT BRIEF DESCRIPTION

LACEDS WILL BE A VERY DENSE (HIGH MASS/AREA RATIO) LASER RETRUREFLECTUR SATELLITE WHICH WILL PROVIDE A PERMANENT REFERENCE POINT IN A VERY STABLE CABIT FOR SUCH PRECISION EARTH-DYNAMICS MEASUREMENTS AS CRUSTAL MOTIONS. PEGIONAL STRAINS. FAULT MOTIONS. POLAR MOTION AND EARTH-ROTATION VARIATIONS. SCLIE EARTH TIDES. AND OTHER KINEMATIC AND DYNAMIC FARAMETERS ASSOCIATED WITH EARTHQUAKE ASSESSMENT AND ALLEVIATION. LAGEDS. IN CONJUNCTION WITH APPROPRIATE LASER TRACKING SYSTEMS, WILL PERMIT EXTREME-PRECISION RANGING MEASUREMENTS FOR BOTH GEOMETRIC MODE (MULTILATERATION) AND GREITAL DYNAMIC MODE DETERMINATIONS OF POSITIONS OF PCINTS ON THE EARTH. IT WILL BE THE FIRST SPACECRAFT DEDICATED EXCLUSIVELY TO HIGH-PRECISION LASER RANGING AND WILL FROVIDE THE FIRST OFFORTUNITY TO ACQUIRE LASER-RANGING DATA THAT IS NOT DEGRADED BY ERRORS ORIGINATING IN THE TARGET SATELLITE. THE HIGH-ACCURACY RANGE MEASUREMENTS FROM THIS PERMANENT ORBITING REFERENCE PRINT WILL BE USED TO ACCOMPLISH MANY EXTREME-FRECISION EARTH-LYNAMICS MEASUREMENTS REQUIRED BY THE EARTHQUAKE HAZARD ASSESSMENT AND ALLEVIATION DEJECTIVES OF THE EARTH AND CCEAN PHYSICS APPLICATIONS PROGRAM (EUPAP). THE PERFORMANCE IN URBIT OF LAGECS WILL BE LIMITED ONLY BY

DEGRADATION OF THE RETROREFLECTORS. SO MANY DECADES OF USEFUL LIFE CAN BE EXPECTED. THE HIGH MASS-TO-AREA RATIO AND THE PRECISE. STABLE (ATTITUDE-INDEPENDENT) GEOMETRY OF THE SPACECRAFT IN CONCERT WITH THE PROPOSED ORBIT WILL MAKE THIS SATELLITE THE MOST PRECISE POSITION REFERENCE AVAILABLE. BECAUSE IT WILL BE VISIBLE IN ALL PARTS OF THE WORLD AND WILL HAVE AN EXTENDED OPERATION LIFE IN ORBIT, LAGEDS CAN SERVE AS A FUNDAMENTAL GLOBAL STANDARD FOR DECADES.

ON 00/00/73, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- MARINER-J VENUS/MERCURY MARINER 73, PL-732A ALTERNATE NAMES-

NSSOC ID MARINJ

PLANNED LAUNCH CATE- 10/00/73

SPACECRAFT WEIGHT IN CRBIT-

ΚG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY

APD APS IS -

UNITED STATES

NASA-CSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- HELICCENTRIC

ORBIT PERICO-AU RAD PERIAPSIS-

DAYS

AU RAD INCLINATION-

WASHINGTON, DC

DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=FROJECT SCIENTIST)

PM - W.E. GIBSON

NASA-JPL

PASADENA + CA

CUNNINGHAM PS - N.W.

NASA HEADGLARTERS

SPACECRAFT BRIEF DESCRIPTION

THE MARINER VENUS/MERCURY 73 IS DESIGNED TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANET MERCURY'S ENVIRONMENT. ATMOSPHERE, SURFACE, AND BUDY CHARACTERISTICS. AND TO OBTAIN ENVIRONMENTAL AND ATMOSPHERIC DATA FROM VENUS DURING THE FLYBY OF VENUS. THE SPACECRAFT'S SECONDARY CEJECTIVE WILL BE TO PERFORM INTERPLANETARY EXPERIMENTS WHILE THE SPACECRAFT IS ENROUTE FRUM EARTH TO MERCURY, AND TO OBTAIN EXPERIENCE WITH A DUAL PLANET GRAVITY ASSIST MISSIGN.

ON 07/11/70. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- PHOTOGRAPHS OF MERCURY AND VENUS NSSCO IC MARINJ -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. QI=CTHER INVESTIGATOR) PASADENA, CA PI - B.C. MURRAY CAL TECH KITT PEAK NATE OBS TUCSON: AZ CI - M.J.S. BELTON U OF ARIZONA 01 - G.P. KUIPER TUCZON . AZ U OF WISCONSIN MADISON. WE 01 - V.E. SUOMI US GEOLOGICAL SURVEY MENLO PARK. CA 01 - N.J. TRASK. JR. MCFFETT FIELD, CA NASA-ARC QI - D.E. GAULT U OF PITTSBURGH PITTSBURG. PA DI - B.W. HAPKE RAND CORP SANTA MONICA. CA CI - M.E. DAVIES ITHACA, NY OI - B.T. D'LEARY CORNELL U

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL TAKE TELEVISION-VIDEO PHOTOGRAPHY OF BCTH VENUS AND MERCURY. THE OBJECTIVES OF THE EXPERIMENT WILL BE - (1) TO MAP AND IDENTIFY THE MAJOR PHYSIOGRAPHIC PROVINCES OF MERCURY. (2) TO DETERMINE THE ORIENTATION OF THE SPIN AXIS OF MERCURY. (3) TO COMBINE ALL OF THE MERCURY DATA TO ESTABLISH A CARTOGRAPHIC COORDINATE SYSTEM. (4) TO INVESTIGATE THE TIME-DEPENDENT PROPERTIES OF THE VENUS ULTRAVIOLET "CLOUDS." AND (5) TO OBTAIN HIGH-RESCLUTION IMAGERY OF THE MAIN CLOUDS OF VENUS. THE INSTRUMENT WILL BE A GEC 1 "VICIOON TUBE." IT WILL HAVE A 42-SEC FRAMING RATE AND A 0.48- BY 0.37-DEG FIELD OF VIEW AND WILL USE TWO SPHERICAL TELESCOPE 150-MM OPTICS. IT IS PLANNED THAT APPROXIMATELY E350 PICTURES. WITH A RESCLUTION OF 100 M. WILL BE GETAINED.

ON 07/11/70. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- S- AND X-BAND RADIO PROPAGATION

NSSDC ID MARINJ -02

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - H.T.	HOWARD	STANFORD U	STANFORD, CA
DI - G.S.	LEVY	NASA-JPL	PASADENA, CA
OI - I.I.	SHAP IRO	MIT	CAMERIDGE. MA
OI - G.	FJELD80	NA SA — JPL	PASADENA. CA
.L.A - 19	KLIORE	NASA-JPL	PASAUENA, CA
01 - J.C.	ANDERSON	NA SA-JPL	FASADENA. CA

## EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT WILL UTILIZE THE CNECARD S- AND X-EAND RADIO SUBSYSTEMS TO CETAIN INFORMATION ON THE MERCURIAN AND VENUSIAN MASSES, GRAVITIES, HARMONICS, EPHEMERIDES, IONOSPHERES, ATMOSPHERES, RADII, AND SURFACE CHARACTERISTICS.

ON 07/11/70. THE SPACECRAFT MISSION WAS APPRICAD.

EXPERIMENT NAME- MEASUREMENT OF PLASMA ENVIRONMENT

NSSDC ID MARINJ -03

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H.S.	BRIDGE	MIT CAMERIDGE. MA
CI - J.H.	<b>EINSACK</b>	MIT CAMBRIDGE NA
01 - A.J.	LAZARUS	. MIT CAMERICGE. MA
01 - S.	OLBERT	MIT CAMERIDGE, MA
01 - S.J.	BAME	LOS ALAMOS SCI LAB LOS ALAMOS. NM
QI - M.D.	MONT COMERY	
DI - A.j.	HUNDHAUSEN	
OI - J.R.	ASBRICGE	LOS ALAMOS SCI LAB LOS ALAMOS. NM
GI - K.W.	GGIL VIE	NASA-GSEC GREENBELT, ND
0I - L.F.	<b>BURL AGA</b>	NASA-GSFC GREENBELT, MC
01 - R.E.	HARTLE	NASA-GSFC GREENEELT, ND
OI - C.W.	SNYDER	NA SA-JPL FASADENA. CA
OI - G.L.	S ISCOE	U DE CALIFORNIA. LA LOS ANGELES. CA

# EXPERIMENT BRIEF DESCRIPTION

A SET OF FEMISPHERICAL ANALYZER PLATES AND AN ELECTRON MULTIPLIER. ALL MOUNTED ON A SCAN PLATFORM, WILL BE PROGRAMMED WITH A SEQUENCE OF ANALYZER

PLATE VOLTAGES TO DETERMINE THE DIRECTIONAL CHARACTERISTICS AND THE ENERGY SPECTRUM FOR ELECTRONS FROM 4 TO 400 EV AND IONS FROM 80 EV TO 8 KEV IN THE SOLAR WIND BETWEEN 0.4 AND 1 AU DISTANCE FROM THE SUN.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER

NSSDC ID MARINJ -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) GREENEELT, ND NA SA - G SF C PI - N.F. GREENBELT. MD NASA-GSFC BEHANNON 01 - K.W. GREENEELT, MD NASA-GSFC LEPPING 01 - R.P. WASHINGTEN, DC CATHOLIC U DI - Y.C. WHANG

# EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO TRIAXIAL FLUXGATE MAGNETCMETERS DESIGNED TO MAKE VECTOR MEASUREMENTS OF THE MAGNETIC FIELD IN THE VICINITY OF MERCURY AND VENUS AND IN THE INTERPLANETARY NEGLUM. EACH SENSOR WILL HAVE DUAL OPERATING RANGES OF MINUS TO PLUS 16 GAMMAS AND 128 GAMMAS. BIAS OFFSET CAPABILITY WILL EXTEND THE OPERATING RANGE TO MINUS TO PLUS 4096 GAMMAS.

ON 07/11/70. THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- EUV SPECTROSCOPY

NESDC ID MARINU -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=OTHER INVESTIGATOR)

PI - A.L. BROADFOCT KITT PEAK NATL CBS TUCSON. AZ
DI - M.B. MCELROY KITT PEAK NATL CBS TUSCON. AZ
DI - M.J.S. BELTON KITT PEAK NATL CBS TUCSON. AZ

# EXPERIMENT BRIEF DESCRIPTION

TWO EUV GRATING SPECTROMETERS WILL BE USED (1) TO DETECT THE PRESENCE OF AN ATMOSPHERE ON MERCURY AND DETERMINE ITS STRUCTURE AND COMPOSITION. (2) TO GBSERVE AND DETERMINE THE STRUCTURE AND COMPOSITION OF THE VENUSIAN ATMOSPHERE. (3) TO MAP THE DIFFLSE GALACTIC AND INTERPLANETARY EACKGROUND RADIATION, AND (4) TO DESERVE THE EARTH GECCORDIA. ESPECIALLY AT 584 AND 1216 A. THE EXISTENCE OF AN ATMOSPHERE ON MERCURY WILL BE DETERMINED BY USING ONE OF THE SPECTROMETERS TO OBSERVE THE ATMOSPHERE DURING SCLAR OCCULTATION IN FOUR CHANNELS -- 475 A, 740 A, 810 A, AND 890 A -- EACH HAVING A 40-A BANDWIDTH. THE SECOND SPECTROMETER WILL BE USED TO OBSERVE AIRGLOW EMISSIONS FROM THE EARTH. MERCURY. VENUS AND EACKGROUND SCURCES IN NINE CHANNELS -- 304 A, 584 A, 744 A, 736 A, 667 TO 679 A, 1048 A, 1216 A, 1304 A, 1657 A, FROM THESE DATA, THE MOST LIKELY CONSTITUENTS OF THE ATMOSPHERES OF MERCURY AND VENUS WILL EE DETERMINED.

UN 07/11/70. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- TWO-CHANNEL IR RADIOMETER

NSSDC ID MARINJ -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - S.C. CHASE, JF. SANTA BARBARA RSCH CEN GELETA. CA 01 - D. MORRISON U OF HAWAII BERKELEY. CA CI - G. MUNCH CAL TECH FASADENA, CA 01 - G. NEUGEBAUER CAL TECH PASADENA, CA OI - J.M. SAARI BOEING SCI RSCH LABS SEATTIF. WA 0I - E.C. MINER NA SA - JPL PASADENA. CA

#### EXPERIMENT BRIEF DESCRIPTION

AN INFRARED RADIOMÈTER HAVING TWO CHANNELS, 22 TO 39 MICRONS (80 DEG K TO 300 DEG K) AND 10 TO 17 MICRONS (200 DEG K TO 650 DEG K), WILL BE USED TO OBSERVE THE THERMAL EMISSION FROM VENUS AND MERCURY IN TWO BROAD SPECTRAL BANDS. THE IR THERMAL EMISSION FROM THE SURFACE OF MERCURY EETWEEN LATE AFTERNOON AND EARLY MORNING (LOCAL TIME) AND DEVIATIONS FROM THE AVERAGE THERMAL BEHAVIOR OF THE SURFACE WILL BE MEASURED. MEASUREMENTS WILL ALSO BE MADE OF THE BRIGHTNESS TEMPERATURES OF VENUSIAN CLOUD TOPS AND LIME DARKENING PHENOMENA.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - ENERGETIC PARTICLES

NSSDC IC MARINJ -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=(THEF INVESTIGATOR)
PI - J.A. SIMPSON U OF CHICAGO CHICAGO, IL
OI - J.E. LAMPORT U OF CHICAGO CHICAGO. IL

## EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL MEASURE THE CHEMICAL AND ISCTCPIC SPECIES OF SOLAR CHARGED PARTICLES BOMBARDING THE ATMOSPHERE AND SURFACE OF MERCURY. THE MEASUREMENTS WILL ALSO INCLUDE A SEARCH FOR TRAFFEC HIGH-ENERGY ELECTRONS AND PROTONS IN THE POSSIBLE MAGNETOSPHERES OF MERCURY AND VENUS. THE CHARGED PARTICLE TELESCOPE WOULD BE SENSITIVE TO ELECTRONS AND PROTONS WITH ENERGIES E.GT. 200 KEV AND E.GT. 600 KEV, RESPECTIVELY.

ON 07/11/70. THE SPACECRAFT MISSICH WAS APPROVED.

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SPACECRAFT COMMON NAME- MARINER 77A NSSCC IC MARN77A
ALTERNATE NAMES- MARINER JUPITER/SATURN A. CUTER FLANETS A

PLANNED LAUNCH DATE- 08/00/77 SPACECRAFT WEIGHT IN ORBIT- 70. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
UNITED STATES
NASA-DSS

SPACECRAFT PERSONNEL (PM=PRCJECT MANAGER, FS=PRCJECT SCIENTIST)
PM + H+ SCHURMEIER NASA-JPL PASADENA, CA

SPACECRAFT ERIEF DESCRIPTION

THE OVERALL DEJECTIVES OF THE TWO SPACECRAFT. MARINER 774 AND MARINER 778, WILL BE TO CONCUCT EXPLORATORY INVESTIGATIONS OF THE PLANETARY SYSTEMS OF JUPITER AND SATURN AND OF THE INTERFLANETARY MEDIUM OUT TO SATURN. PRIMARY EMPHASIS WILL BE PLACED ON COMPARATIVE STUDIES OF THESE THO PLANETARY SYSTEMS BY COTAINING (1) MEASUREMENTS OF THE ENVIRONMENT. ATMOSPHERE. AND EDDY CHARACTERISTICS OF THE PLANETS AND CHE OR MORE OF THE SATELLITES OF EACH PLANET. (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN, AND (3) EXPLORATION OF THE INTERPLANETARY (OR INTERSTELLAR) MEDIUW AT INCREASING DISTANCES FROM THE SUN. THESE CHJECTIVES WILL BE ATTAINED BY USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING TV. A COHERENT S- AND X-BAND OF RECEIVER. AN INFRARED INTERFERENCETER. ULTRAVIOLET SPECTROMETER. FLUXGATE MAGNETCHETERS. FARADAY CUPS. A PARTICLE ANALYZER, FARTICLE TELESCOPES, THE SISYPHUS METHOD PHOTOPOLARIMETER. AND A SWEEP FREQUENCY RADIO RECEIVER. THE THE SPACECRAFT WILL BE LAUNCHED WITHIN A MONTH OF EACH OTHER.

ON 11/20/72. THE SPACECRAFT MISSION WAS APPRICADE.

EXPERIMENT NAME- TV PHOTOGRAPHY

NESCO ID MARN77A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) LAS CRUCES. NM NEW MEXICO STATE U SMITH PI - B.A.

# EXPERIMENT BRIEF CESCRIFTION

THE TV PHOTOGRAPHIC EXPERIMENT WILL USE A TWO-CAMERA SYSTEM. BASED ON THE MAKINER 9 TV SYSTEM. THIS SYSTEM WILL INCLUDE ONE NARROW-ANGLE. LONG FUCAL LENGTH CAMERA AND ONE WIDE-ANGLE. SHERT FOCAL LENGTH CAMERA. THE MAXIMUM RESOLUTION ACHIEVABLE WILL DEPEND GREATLY ON THE ACTUAL TRAJECTORY ON THIS MULTI-ENCOUNTER MISSION. BUT THE RESULUTION WILL BE AS HIGH AS 0.5 TO 1.0 KM ON THE CLOSEST APERDACHES. AT JUPITER AND SATURN, THE RESOLUTION WILL BE 20 KM AND 5 KM. RESPECTIVELY. THE OBJECTIVES OF THE EXPERIMENT WILL BE TO PHOTOGRAPH GLOBAL MOTIONS AND CLOUD DISTRIBUTIONS ON JUPITER AND SATURN. GROSS DYNAMICAL PROPERTIES. ZONAL ROTATION OF SPIN AXIS, ZONAL SHEAR, VERTICAL SHEAR, FLOW INSTABILITIES, SPOTS, AND SPECTRUM OF SCALE OF ATMOSPHERIC MOTIONS IN TIME AND SPACE. ADDITIONAL DEJECTIVES WILL INCLUDE THE STUDY OF THE NCDE OF FELEASE OF INTERNAL ENERGY FLUX (SEARCH FOR CONVECTION CELLS AND ROLLS). STUDY OF GROWTH. DISSIPATION. MORPHCLEGY, AND VERTICAL STRUCTURE OF CLOUD COMPLEXES. GROSS CETICAL PROPERTIES, GLOBAL AND LOCALIZED SCATTERING FUNCTION IN THE VISIBLE SPECTRUM. PULARINETRY, NATURE OF CHROMOFHORES. THIN STRUCTURE AND DEVELOPMENT, AND HIGH RESOLUTION OF THE GREAT RED SPOT. THE COJECTIVES OF THE SATELLITE ENCOUNTERS WILL INCLUDE -- (1) GRCSS CHAFACTERISTICS - SIZE. SHAPE, ROTATION, SPIN AXIS, CARTDGRAPHY, IMPREVED EFHENERICES AND MASSES, (2) GECLOGY -- MAJOR PHYSIOGRAPHIC PROVINCES, IMPACT AND VOLCANIC FEATURES. LINEAMENTS. POLAR CAPS. EROSION PROCESSES. AND LEW- AND HIGH-DENSITY SATELLITE COMPARATIVE STUDIES, DETECTION OF ATMOSPHERES, PROSTS, AND LIME STRATIFICATION OF AEROSOLS. (3) SUFFACE PROPERTIES - COLORINETRY, SCATTERING FUNCTION. NATURE OF BRIGHTNESS VARIATION (ESPECIALLY IAPETUS). AND SEARCH FUR HEW SATELLITES. STUDIES OF SATURN'S FINGS WILL BE CARRIED OUT. UBJECTIVES WILL INCLUDE -- (1) RESOLUTION OF INDIVIDUAL RING COMPONENTS OF CLUMPS OF MATERIAL. (2) VERTICAL AND RADIAL DISTRIBUTION OF MATERIAL OF VERY HIGH RESULUTION, (3) SCATTERING FUNCTION, (4) CCARSE FCLARIMETRY, (5) SECULTATION - OPTICAL DEPTH. AND (6) DISTINGUISHING DIFFERENT TYPES OF MATERIAL IN THE RINGS . OTHER OBJECTIVES WILL BE TO SEARCH FOR NEW COMETS. ASTERLIDS. AND TARGETS OF OFFCRTUNITY.

ON 11/20/72. THE SPACECRAFT MISSION WAS APPROVED.

## EXPERIMENT NAME- COHERENT S- AND X-BAND TRANSMITTER AND NSSDC ID MARN77A-02 S-EAND RECEIVER

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	OI=OTHER INVESTIGATOR)
PI - V.R.	ESHLEMAN	STANFORD L	STANFORD, CA
01 - J.D.	ANDERSON	NASA- JPL	PASADENA, CA
01 - T.A.	CROFT	STANFORD U	STANFORD. CA
81 - G.L.	TYLER	STANFORD U	STANFORD. CA
01 - G.	FJELDBD	NASA-JPL	PASADENA. CA
01 - G.S.	L EV Y	NASA-JPL	PASADENA, CA

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE PROPAGATION PATH EFFECTS ON THE SPACECRAFT TELECOMMUNICATIONS SYSTEM TO INVESTIGATE SEVERAL AREAS OF INTEREST. S-BAND UPLINK SIGNALS. AND COHERENT X- AND S-BAND DOWNLINK SIGNALS WILL BE STUDIED. AREAS OF STUDY WILL INCLUDE PLANETARY NEUTRAL, ELECTRON, AND ION DENSITIES. TEMPERATURES. AND COMPOSITION. THEY WILL ALSO INCLUDE PHYSICAL PROPERTIES OF ASTEROIDS. SATURN'S RINGS, AND PLANETARY SURFACES. IN ADDITION, STUDIES WILL BE MADE OF MAGNETIC FIELDS. INTERSTELLAR AND SCLAR WIND ELECTRON CENSITIES. SOLAR CORONA STRUCTURE. PLANETARY 13-CM RADIO EMISSIONS. AND RELATIVITY.

ON 11/20/72. THE SPACECRAFT MISSICN WAS APERCUED.

# EXPERIMENT NAME- INFRARED SPECTROSCOPY AND RADIOMETRY NSSCC 10 MARN77A-03

EXPERIMENT	PERSUNNEL (P)	=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - R.A.	HANEL .	NASA-GSFC	GREENBELT. MD
01 - B.J.	CONFATH	NASA-GSFC	GREENBELT. MD
01 - V.G.	KUNDE	NASA-GSFC	GREENEELT, MD
OI - P.D.	LOWMAN: JR.	NASA- GSFC	GREENBELT, MD
O1 - W.C.	MAGUIRE	NASA-GSFC	GREENEELT, MD
01 - J.C.	PEARL	NASA-GSFC	GREENEELT. MC
CI - J.	PIREAGLIA	NASA-GSFC	GREENBELT. NO
01 - R.E.	SAMUELSCN	NASA-GSFC	GREENBELT: MC
OI - T.E.	BURKE	NASA-JPL	FASADENA, CA
G1 - P.	GIEE AS F	CORNELL U	ITHAÇA. NY
GI - C.A.	PONNAMPERUMA	U OF MARYLAND	CCLLÈGE FARK. MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED CUT USING AN INFRAREC RACIDMETER AND AN INTERFEROMETER SPECTROMETER SIMILAR IN DESIGN TO THE MARINER-MARS-71 IRIS, COMBINED INTO A SINGLE INSTRUMENT. THE INVESTIGATION WILL STUDY BOTH GLOBAL AND L'OCAL ENERGY EALANCE, USING INFRARED SPECTRAL MEASUREMENTS IN CONJUNCTION WITH BROAD-BAND MEASUREMENTS OF REFLECTED SOLAR ENERGY. ATMOSPHERIC COMPOSITION WILL ALSO BE INVESTIGATED, INCLUDING DETERMINATION OF THE HZ/HE RATIO, AND THE ABUNDANCE OF CHA AND MH3. VERTICAL TEMPERATURE PROFILES WILL BE CEMPASITION, THE PLANETS AND SATELLITES WITH ATMOSPHERES. STUDIES OF THE CEMPOSITION, THERMAL PROFERTIES, AND SIZE OF FARTICLES IN SATURN'S RINGS WILL BE CONDUCTED. THE INTERFEROMETER WILL HAVE A SPECTRAL RANGE OF 200 TO 2200 I/CM, WHILE THE RADIOMETER RANGE WILL COVER 5000 TO 33,000 I/CM. THE INSTRUMENT WILL USE A SINGLE PRIMARY MIRROR SI ON IN DIAM. WITH A FIELD OF VIEW OF 0.25 CEG.

ON 11/20/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - ULTRAVIOLET SPECTRESCEPY

NSSDC ID MARN77A-04

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, CI=C	THER INVESTIGATOR)
PI - A.L. BROADFOLT	KITT PEAK NATE EBS	TUCSON. AZ
DI - H.W. MOGS	JOHNS HCPKINS L	EALTINCRE, MD
OI - M.J.S. BELTCH	KITT PEAK NATE CUS	TUCSON+ #Z
dI - D.F. STROBEL	KITT PEAK NATE OBS	TUCSON. AZ
DI - T.M. DONAFUE	L OF PITTSBLEGH	PITTSEURGH, PA
DI - M.E. MCELECY	HAR VARD U	CAMERIDGE. NA
GI - J.C. MCCONNELL	HARVARD U	CAMBRIDGE, MA
GI - R.M. GODGY	HARVARD L	CAMERICGE, MA
OI - A. CALCAPNE	HARVARD L	CAMBRIDGE, MA

# EXPERIMENT ERIEF CESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT WITH AN EXTREME ULTRAVICLET SPECTHOMETER, UTILIZING 12 CHANNEL MULTIPLIERS AS SENSORS AND COVERING SELECTED SPECTRAL LINES IN THE RANGE FROM 400 TO 1800 A. SINILAR IN DESIGN TO THE INSTRUMENT CURRENTLY BEING PROVIDED FOR THE MARINER VENUS-MERCURY 73 MISSION. THE INVESTIGATION WILL ANALYZE THE ATMOSPHERES OF JUPITER, SATURN AND ENCOUNTERED SATELLITES FOR THEIR MAJOR CONSTITUENTS, INCLUDING THE DETERMINATION OF THE MIXING RATIO OF H2 AND HE AND THE THERMAL STRUCTURE OF THE ATMOSPHERE. AN ADDITIONAL OBJECTIVE WILL BE TO STUDY THE CISTRIBUTION OF H2 AND HE IN THE INTERPLANETARY AND INTERSTELLAR MEDIUM.

ON 11/20/72, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETERS

NSSDC ID MARN77A-05

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - N.F.		NA SA-GSEC	GREENEELT. MC
OI - Maha	ACUNA	NA SA - GSFC	GREENEELT. NC
CI + K.W.	BEHANNON	NASA-GSFC	GREENSELT, MD
01 - L.F.	BURL AGA	NASA-GSEC	GREENEELT. MC
GI - 8.P.	LEPF INC	NA SA-GSFC	GREENEELT. NO
01 - F.M.	NEUBAUER	PRAUNISCHWEIG TECH	H L BRAUNSCHWEIG: N. GERMANY

## EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INVESTIGATE THE MAGNETIC FIELDS OF JUPITER AND SATURN, THE SOLAR WIND INTERACTION WITH THE MAGNETUSPHERES OF THESE PLANETS. AND THE INTERPLANETARY MAGNETIC FIELD TO THE EXTENT OF THE SOLAR WIND ECUNDARY WITH THE INTERSTELLAR MAGNETIC FIELD AND BEYOND. IF CROSSEL. THE INVESTIGATION WILL BE CARRIED OUT USING TWO HIGH-FIELD AND TWO LOW-FIELD TRIAXIAL FLUXGATE MAGNETOMETERS. DATA ACCURACY OF THE INTERPLANETARY FIELDS WILL BE PLUS OF MINUS 0.1 GAMMA. AND THE RANGE OF MEASUREMENTS WILL BE FROM 0.01 GAMMA TO 20 GAUSS. THE INSTRUMENTATION WILL WEIGH 5.8 KG AND COMSUME 5.2 WATTS.

ON 11/20/72, THE SPACECEAFT MISSION WAS APPROVED.

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - H.S.	BRIDGE	MIT	CAMERIDGE. MA
OI - 1.W.	BELCHER	MIT	CAMBRIDGE . MA
GI - J.H.	EINSACK	TIM	CAMERIDGE. NA
0I - A.J.	LAZARUS	MIT	CAMBRIDGE . MA
OI - 5.	CLBERT	MIT	CAMBRIDGE. MA
DI - V.M.	VASYL IUNAS	NIT	CAMERIDGE. NA
01 - L.F.	EURLAGA	NASA-GSFC	GREENBELT. MD
0I - R.E.	HARTLE	NASA-GSFC	GREENBELT. MD
CI - K.W.	OGILVIE	NASA-GSEC	GREENEELT. MC
DI - G.L.	SISCUE	U OF CALIFORNIA.	LA LOS ANGELES. CA
CI - A.J.	HUNCHAUSEN	NATE CHTR ATMOS F	SCH BOULDER. CO

## EXPERIMENT ERIEF DESCRIPTION

THE PLASMA INVESTIGATION WILL MAKE USE OF TWO FARADAY CUP DETECTORS. ONE POINTED ALONG THE EARTH-SPACECRAFT LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE EARTH-POINTING DETECTOR WILL DETERMINE THE MACROSCOFIC PROPERTIES OF THE FLASMA IONS, CETAINING ACCURATE VALUES OF THEIR VELOCITY, CENSITIES. AND PRESSURE. THREE SEQUENTIAL ENERGY SCANS WILL BE EMPLOYED WITH CELTA E/E EQUAL TO 29. 7.2. AND 1.8 PERCENT. ALLOWING A COVERAGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLOW. THE SIDE-LOCKING FARADAY CUP WILL MAKE MEASUREMENTS OF ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV. THE INSTRUMENT WILL WEIGH 5.5 KG AND USE 6.5 W OF POWER.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY CHARGED PARTICLE ANALYZER AND NSSDC ID MARN77A-07 TELESCOPE

EXPERIMENT	PERSONNEL (PI=PR	INCIPAL INVESTIGATOR. 01=0	THER INVESTIGATORS
PI - S.M.	KRIM1618	APPLIED PHYSICS LAE	
01 - C.A.	FAN	U OF ARIZONA	TUCSON, AZ
CI - G.	GLOFCKLER	U OF MARYLAND .	COLLEGE PARK. MD
UI - L.J.	LANZEROTTI	BELL TELEPHONE LAB	MURRAY HILL. NJ
GI - T.F.	ARMSTRONG	U OF KANSAS	LA MRENCE . KS
01 - W.I.	AX,FGRD	U OF CALIFORNIA, SD	SAN DIEGO. CA
01 - C.O.	BUSTREM	APPLIED PHYSICS LAN	STIVER SERING. MD

#### EXPERIMENT ERIEF CESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE MAGNETUSPHERES OF JUPITER AND SATURN USING A LOW-ENERGY MAGNETOSPHERIC PARTICLE ANALYZER. THIS DETECTOR WILL MAKE MEASUREMENTS IN (1) THE DISTANT MAGNETOSPHERE AND BOW SHOCK OF JUPITER. (2) THE POSSIBLE MAGNETOSPHERE OF SATURN. AND (3) THE TRAFPED RADIATION HELTS IN THE VICINITY OF JUPITER. ADDITIONALLY, THIS DETECTOR WILL BE ABLE TO STUDY LOW-ENERGY PARTICLES IN THE INTERPLANETARY MEDIUM. THE ENERGY FANGE OF THIS DETECTOR WILL BE 10 KEV TO 1.1 MEV FOR ELECTRONS AND 10 KEV TO 150 MEV FOR ICNS. DURING THE INTERPLANETARY CRUISE PERIOD. PROTONS, ALFHA PARTICLES, AND FEAVIER NUCLEI (2 FRON 3 TO 26) WILL BE SEPARATELY IDENTIFIED AND THEIR ENERGY MEASURED IN THE RANGE FROM 0.05 TO 30 MEV. USING A LOW-ENERGY PARTICLE TELESCOPE. HOWEVER, SELECTION OF THE LOW-ENERGY TELESCOPE IS CONDITIONAL ON DEMONSTRATING THE PRODUCTION OF SUFFICIENTLY UNIFORM DETECTORS TO EFFECT THE SEPARATION OF THE NUCLEI IN THE LOW-ENERGY END OF THE PROPOSED INVESTIGATION RANGE (LESS THAN 1.8 MEV/NUCLEON).

ON 11/20/72. THE SPACECRAFT MISSION WAS APPROVED.

# EXPERIMENT NAME- HICH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE

NSSDC ID MARN77A-08

EXPERIMENT PI - R.E. OI - J.R. OI - E.C.	PERSONNEL VOGT JOKIPII STONE MCDONALD	(PI=PRINCIPAL INVESTIGATOR CAL TECH CAL TECH CAL TECH NASA-GSFC	DI=OTHER INVESTIGATOR)  PASADENA, CA  PASADENA, CA  FASADENA, CA  GREENEELT, MC
OI - F.B. OI - B.J. OI - J.H. OI - W.R.	TEEGARCEN TRAINOR WEBBER	NASA-GSFC NASA-GSFC NASA-GSFC U DF NEW HAMPSH	GREENBELT, MD Greenbelt, MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO DETERMINE, USING A HIGH-ENERGY TELESCOPE, THE ENERGY AND IDENTITY OF NUCLEI FOR ENERGIES BETWEEN 6 AND 500 MEV AND FOR NUCLEI RANGING IN ATOMIC NUMBER FROM 1 THROUGH 30. IN ADDITION, THIS TELESCOPE WILL MEASURE ELECTRONS OF ENERGIES FROM 3 TO 10 MEV. THE ENERGY AND IDENTITY OF NUCLEI WILL BE DETERMINED FOR ENERGIES BETWEEN 0.15 AND 30 MEV AND ATOMIC NUMBERS FROM 1 THROUGH 30 LSING A LOW-ENERGY TELESCOPE. THESE MEASUREMENTS WILL ALLOW AN UNDERSTANDING (1) OF THE NUCLEOSYNTHESIS OF ELEMENTS IN COSMIC-RAY SOURCES AND (2) OF THE ORIGIN AND ASSOCIATED ACCELERATION PROCESS AS WELL AS THE LIFE HISTORY AND DYNAMIC CONTRIBUTION OF COSMIC RAYS IN THE GALAXY. IN ADDITION, THE TRAPPED PLANETARY ENERGETIC PARTICLE ENVIRONMENT WILL BE STUDIED. THESE NEASUREMENTS WILL ALSO ALLOW AN UNDERSTANDING OF THE MODULATION OF COSMIC RAYS OVER AN EXTENDED REGION OF INTERPLANETARY SPACE.

ON 11/20/72. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- INTERPLANETARY DUST PARTICLE MEASUREMENT NESDC ID MARN77A-09

EXPERT MENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, 01=01	HER INVESTIGATOR)
	SOBERMAN	DREXEL INST OF TECH	PHILACELPHIA: PA
01 - B.A.	LINDBLAD	U OF LUND	SWEDEN
ot - E.	GRUN	WAX PLANCK INST	GERMANY
01 - F.d.	HOUSE	DREXEL INST OF TECH	PHILACELFHIA: PA
01 - H.	FECHTIG	WAX PLANCK INST	HEICELBERG, WEST GERMANY

## EXPERIMENT BRIEF DESCRIPTION

PARTICLE MEASUREMENTS WILL BE MADE USING THE SISYPHUS CONCEPT. IN WHICH SOLAR RACIATION REFLECTED FROM THE PARTICLE IS USED FOR DETECTION. RANGE, AND VELOCITY DETERMINATION. FEUR CFTICAL SYSTEMS HAVING CVERLAPPING CONICAL FIELDS OF VIEW WILL DETECT SUNLIT PARTICLES PASSING THROUGH THE OVERLAP REGION. THE TIMES OF ENTRANCE INTO AND EXIT FROM THE CONES WILL BE USED TO COMPLETELY CETERMINE THE PARTICLE'S TRAJECTORY RELATIVE TO THE INSTRUMENT AND ITS ORBIT IN THE SOLAR SYSTEM. THIS INSTRUMENT WILL BE SIMILAR TO THE ONE BEING FLOWN ON PICNEER 10. THE FIELDS OF VIEW WILL BE 2-DEG HALF-ANGLE, AND THE MIRRORS WILL BE 20 CM IN DIAM. THE MINIMUM DETECTIBLE PARTICLE RACIUS AT 1 AU WILL BE APPROXIMATELY 5 MICRONS. THIS WILL INCREASE TO ABOUT 35 MICRONS AT 10 AL. LIGHT FLASH AND ACCUSTICAL MEASUREMENTS OF PARTICLE IMPACT WILL ALSO BE INCLUDED.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SWEEP FREQUENCY (.02 TG 40 MHZ) RADIO NSSDC ID MARN774-10 RECEIVER

EXPERIMENT	PERSONNEL	(PI =PRINCIP	AL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - J.W.	WARWICK		U OF COLORADE	BOULDER. CO
01 - J.K.	ALEX ANDER,	JR .	NASA-GSFC	GREENEELT, MD
01 - T.D.	CARR		U OF FLORIDA	GAINESVILLE, FL
01 - F.T.	HADDOCK		U DE MICHIGAN	ANN AREOR, MI
OI - D.H.	STAEL IN		MIT	CAMERIDGE. MA
GI - A.	BOISCHOT		MEUDON CB SERVATOR	Y PARIS. FRANCE
01 - C.C.	HARVEY		MEUDON OBSERVATOR	Y PARIS, FRANCE
0I - Y.	LEBLANC		MEUDON OBSERVATOR	Y PARIS. FRANCE
OI - W.E.	BROWN		NA SA-JPL	FASADENA. CA
01 - S.	GULK IS		NASA-JPL	PASADENA. CA
01 - R.	PHILL IPS		NASA-JPL	PASADENA, CA

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A SWEEP FREQUENCY RADIC RECEIVER OPERATING IN BOTH POLARIZATION STATES. BETWEEN 20 KHZ AND 40.5 MHZ. THE SIGNAL WILL BE RECEIVED BY A PAIR OF ORTHOGONAL 10-M MONOPOLE ANTENNAE. STUDY OF THE RACIO EMISSION SIGNALS FROM JUPITER AND SATURN OVER THIS RANGE OF FREQUENCIES WILL YIELD DATA CONCERNING THE PHYSICS OF MAGNETOSPHERIC PLASMA RESONANCES AND THERMAL RADIO EMISSIONS FROM THESE PLANETARY REGIONS.

ON 11/20/72. THE SPACECRAFT MISSION WAS AFFREVED.

EXPERIMENT NAME- MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A

NSSDC ID MARN77A-11

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	OI=OTHER INVESTIGATOR)
PI - C.F.	LILLIE	U OF COLOFADO	BCULDER. CO
01 - C.W.	HORD	U OF COLORADE	8GULDER: CO
01 - K•	PANG	U OF COLORADO	BOLLDER . CO

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN E-IN F/1.1 TELESCOPE. WHICH CAN SEND ITS OBSERVATIONS THROUGH A POLARIZER AND A FILTER FOR CRE OF EIGHT BANCS IN THE 2200- TO 7300-A SPECTRAL REGION. THEN ON TO A PHOTOMULTIPLER TUBE. BY STUDY OF THESE EMISSION INTENSITY DATA. INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH INFORMATION ON SIZE DISTRIBUTION AND COMPOSITION OF THE SATURN RINGS, AND INFORMATION ON ATMOSPHERIC SCATTERING PROFERTIES AND DENSITY FOR BOTH PLANETS. MOLECULAR SCALE HEIGHTS FOR BOTH FLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- MARINER 77E

ALTERNATE NAMES- MARINER JUPITER/SATURN B. CUTER FLANETS E

FLANNED LAUNCH DATE- C9/0C/77 SPACECRAFT WEIGHT IN CREIT- 70. KG

LAUNCH SITE- CAPE KENNELY. UNITED STATES

LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY

#### SPACECRAFT BRIEF DESCRIPTION

THE OVERALL DEJECTIVES OF THE TWO SPACECRAFT, MARINER 77A AND MARINER 77B, WILL BE TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANETARY SYSTEMS, JUPITER AND SATURN, AND OF THE INTERPLANETARY MEDILM OUT TO SATURN. PRIMARY EMPHASIS WILL BE PLACED ON COMPARATIVE STUDIES OF THESE TWO PLANETARY SYSTEMS BY OBTAINING (1) MEASUREMENTS OF THE ENVIRONMENT. ATMOSFIERE, AND BODY CHARACTERISTICS OF THE PLANETS AND ONE OR MORE OF THE SATELLITES OF EACH PLANET, (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN. AND (3) EXPLORATION OF THE INTERPLANETARY (UR INTERSTELLAR) MEDILM AT INCREASING DISTANCES FROM THE SUN. THESE OBJECTIVES WILL BE OBTAINED USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING TV. A CCHERENT S- AND X-BAND RF RECEIVER. AN INFRARED INTERFERUMETER, AN ULTRAVICLET SPECTROMETER, FLUXGATE MAGNETOMETERS, FARACAY CUPS. A PARTICLE ANALYZER, PARTICLE TELESCOPES. THE SISYPHUS METHOD PHOTOPOLARIMETER, AND A SWEEP FREQUENCY RADIO RECEIVER. TWO SPACECRAFT WILL BE LAUNCHED WITHIN A MONTH OF EACH OTHER.

ON 11/20/72. THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- TV PHOTOGRAPHY

NSSDC ID MARN778-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR).CI=CTHER INVESTIGATOR)
PI - B.A. SMITH NEW MEXICO STATE U LAS CRUCES, NM

## EXPERIMENT BRIEF CESCRIPTION

THE TV PHOTOGRAPHIC EXPERIMENT WILL USE A TWO-CAMERA SYSTEM. BASED ON THE MARINER 9 TV SYSTEM. THIS SYSTEM WILL INCLUDE CHE NARROW-ANGLE. LONG FOCAL LENGTH CAMERA AND ONE WICE-ANGLE, SHORT FOCAL LENGTH CAMERA. THE MAXIMUM RESOLUTION ACHIEVABLE WILL DEPEND GREATLY ON THE ACTUAL TRAJECTORY ON THIS MULTI-ENCOUNTER MISSION. BUT WILL BE AS HIGH AS 0.5 TO 1.0 KM ON THE CLOSEST APPROACHES. AT JUPITER AND SATURN. THE RESOLUTION WILL BE 20 KM AND 5 KM, RESPECTIVELY. THE OBJECTIVES OF THE EXPERIMENT WILL BE TO PHOTOGRAPH GLOBAL MOTIONS AND CLOUD DISTRIBUTIONS ON JUPITER AND SATURA. GROSS DYNAMICAL PROPERTIES. ZONAL ROTATION. ORIENTATION OF SPIN AXIS. ZCNAL SHEAR. VERTICAL SHEAR, FLOW INSTABILITIES. SPOTS. AND SPECTRUM OF SCALE OF ATMOSPHERIC MOTIONS IN TIME AND SPACE. ACCITIONAL DEJECTIVES WILL INCLUDE THE STUDY OF THE MODE OF RELEASE OF INTERNAL ENERGY FLUX (SEARCH FCR CONVECTION CELLS AND ROLLS). STUDY OF GROWTH, DISSIPATION, MORPHOLOGY, AND VERTICAL STRUCTURE OF CLOUD COMPLEXES. GROSS OPTICAL FROPERTIES. GLOBAL AND LOCALIZED SCATTERING FUNCTION IN THE VISIBLE SPECTRUM, POLARIMETRY, NATURE OF CHRCMOPHORES, THIN STRUCTURE AND DEVELOPMENT, AND HIGH RESOLUTION OF THE GREAT RED SPOT. THE OBJECTIVES OF THE SATELLITE ENCOUNTERS WILL INCLUDE --(1) GROSS CHARACTERISTICS - SIZE, SHAPE, ROTATION, SPIN AXIS, CARTCGRAPHY.

IMPROVEC EPHEMERIDES AND MASSES. (2) GECLCGY -- NAJCR PHYSICGRAPHIC PROVINCES, IMPACT AND VOLCANIC FEATURES, LINEAMENTS, PCLAR CAPS, EROSION PROCESSES, AND LOW- AND HIGH-DENSITY SATELLITE COMPARATIVE STUDIES. DETECTION OF ATMOSPHERES, FROSTS, AND LIME STRATIFICATION OF AEROSCLS, (3) SURFACE PROPERTIES - COLORIMETRY, SCATTERING FLNCTION, NATURE OF BRIGHTNESS VARIATION (ESPECIALLY IAPETUS), AND SEARCH FOR NEW SATELLITES, STUDIES OF SATURN'S RINGS WILL BE CARRIED OUT, DEJECTIVES WILL INCLUDE -- (1) RESOLUTION OF INCIVIDUAL RING COMPONENTS OR CLUMPS OF MATERIAL, (2) VERTICAL AND RADIAL DISTRIBUTION OF MATERIAL OF VERY HIGH RESOLUTION, (3) SCATTERING FUNCTION, (4) CCARSE FOLARIMETRY, (5) CCCLLTATION - CFTICAL DEPTH, AND (6) DISTINGUISHING DIFFERENT TYPES OF MATERIAL IN THE RINGS, OTHER CBJECTIVES WILL BE TO SEARCH FOR NEW COMETS, ASTEROIDS, AND TARGETS OF OPPORTUNITY.

ON 11/20/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - COHERENT S - AND X-BAND TRANSMITTER AND NSSDC 1D MARN778-02 S-EAND RECEIVER

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	OF CTHER INVESTIGATOR
PI - V.R.	ES HL EMAN	STANFORD U	STANFORD. CA
OI - G.	FJELDBC	NASA-JPL	PASADENA. CA
G1 - G.S.	L.EVY	NASA-JPL	PASADENA . CA
.A.T - 10	CROFT	STANFORD U	STANFORD. CA
01 - G.L.	TYLER	STANFORD U	STANFORD. CA
0I - J.O.	ANDERSON	NASA-JPL	PASADENA. CA

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE PROPAGATION PATH EFFECTS ON THE SPACECRAFT TELECOMMUNICATIONS SYSTEM TO INVESTIGATE SEVERAL AREAS OF INTEREST. S-BAND UPLINK SIGNALS WILL BE STUDIED. AREAS OF STUDY WILL INCLUDE PLANETARY NEUTRAL. ELECTRON, AND ION DENSITIES. TEMPERATURES, AND COMPOSITION. THEY WILL ALSO INCLUDE PHYSICAL PROPERITES OF ASTEROIDS, SATURA'S RINGS. AND PLANETARY SURFACES. IN ADDITION. STUDIES WILL BE MADE OF MAGNETIC FIELDS, INTERSTELLAR AND SOLAR WIND ELECTRON DENSITIES. SCLAR CORONA STRUCTURE. PLANETARY 13-CM FADIO EMISSIONS, AND RELATIVITY.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFRARED SPECTROSCOPY AND RADIOMETRY NSSCC ID MARN778-03

EXPERIMENT	PERSONNEL (	PI=PRINCIPAL INVESTIGATOR.	GI=CTHER INVESTIGATOR)
PI ~ R.A.	FANEL	NASA-GSFC	GREENBELT, NO
OI ~ C.A.	PONNAMP ERUM	A U OF MARYLAND	COLLEGE PARK, MD
Q1 ~ T.E.	BURKE	NASA-JPL	PASADENA. CA
01 - P.	GI ERASF	CORNELL U	I THACA . NY
01 - 1.	PIRRAGLIA	NASA-GSFC	GREENBELT. MD
01 - R.E.	SAMUELSON	NASA-GSFC	GREENEELT. NO
01 - W.C.	MAGUIRE	NASA – GSFC	GREENBELT, ND
OI - J.C.	PEARL	NASA-GSFC	GREENBELT. MD
01 - V.G.	KUNDE	NASA-GSFC	GREENEELT, MD
01 - P.D.	LOWMAN. JR.	NASA-GSFC	GREENBELT, MD
GI - B.J.	CONRATH	NASA-GSFC	GREENBELT, MD

EXPERIMENT ERIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED CUT USING AN INFRARED RADIGMETER AND AN INTERFEROMETER SPECTROMETER SIMILAR IN DESIGN TO THE MARINER-MARS 71 IRIS. CUMBINED INTO A SINGLE INSTRUMENT. THE INVESTIGATION WILL STUDY BOTH GLUBAL AND LOCAL ENERGY EALANCE, USING INFRARED SPECTRAL MEASUREMENTS IN CONJUNCTION WITH BREAC-BAND MEASUREMENTS OF REFLECTED SCLAR ENERGY. ATMOSPHERIC COMPOSITION WILL ALSO BE INVESTIGATED, INCLUDING DETERMINATION OF THE HZ/HE RATIO. AND THE ABUNDANCE OF CH4 AND NH3. VERTICAL TEMPERATURE PROFILES WILL BE OBTAINED ON THE PLANETS AND SATELLITES WITH ATMOSPHERES. STUDIES OF THE COMPCSITION. THERMAL PROPERTIES. AND SIZE OF PARTICLES IN SATURN'S RINGS WILL BE CONDUCTED. THE INTERFEROMETER WILL HAVE A SPECTRAL RANGE OF 200 TO 3300 1/CM, WHILE THE RADICMETER RANGE WILL COVER 5000 TC 33.000 1/CM. THE INSTRUMENT WILL USE A SINGLE PRIMARY MIRROR 51 CM IN DIAM. WITH A FIELD OF VIEW OF 0.25 DEG.

ON 11/20/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET SPECTROSCOPY

NSSDC ID MARN778-04

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EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=(THER INVESTIGATOR)
                               KITT PEAK NATE CBS TUCSON. AZ
         BROADFOCT
PI - A.L.
                                                     CAMBRIDGE . MA
                               HARVARD U
           CALGARNO
OI - A.
                                                     CAMERIDGE: MA
                               HARVARD 6
           MCCONNELL
01 - J.C.
                                                     CAMERIDGE, MA
                              HARVARD U
           GODDY
OI - R.M.
                                                     PITTSEUR GH . PA
                              U CF PITTSEURGH
          CONAHUE
DI - T.M.
                                                     CAMERIDGE. MA
                               FARVARD L
           MCELFCY
01 - M.B.
                               KITT PEAK NATE COS
                                                     TUCSON: AZ
OI - M.J.S. BELTON
                                                     TUCSON. AZ
                               KITT PEAK NATE CBS
.01 - D.F. STROBEL
                                                     BALTINCRE. MD
                               JOHNS HOPKINS U
           MOOS
DI - H.W.
```

## EXPERIMENT ERIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT WITH AN EXTREME ULTRAVICLET SPECTROMETER UTILIZING 12 CHANNEL MULTIPLIERS AS SENSORS AND COVERING SELECTED SPECTRAL LINES IN THE RANGE FROM 400 TO 1800 A. SINILAR IN CESIGN TO THE INSTRUMENT CURRENTLY BEING PROVIDED FOR THE MARINER VENUS-MERCURY 73 MISSION. THE INVESTIGATION WILL ANALYZE THE ATMOSPHERES OF JUPITER. SATURN AND ENCOUNTERED SATELLITES FOR THEIR MAJOR CONSTITUENTS, INCLUDING THE DETERMINATION OF THE MIXING RATIO OF HE AND HE AND THE THERNAL STRUCTURE OF THE ATMOSPHERE. AN ADDITIONAL DEJECTIVE WILL BE TO STUDY THE DISTRIBUTION OF HE AND HE IN THE INTERPLANETARY AND INTERSTELLAR MECIUM.

ON 11/20/72. THE SPACECRAFT MISSICH WAS AFFREVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETERS

NSSDC ID MARN778-05

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EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CT+EF INVESTIGATOR)
                                                      GREENEELT. MD
                                NASA-GSFC .
NASA-GSFC
PI - N.F.
           NESS
                                                       GREENBELT. ND
           LEPPING
01 - R.P.
                                                      BRAUNSCHWEIG. W. GERMANY
                                BRAUNSCHWEIG TECH L
           NEUBAUER
GI - F.M.
                                                      GREENEELT, MD
                                NASA-GSFC
           BEHANNON
01 - K.W.
                                                      GREENEELT. ND
                                NASA-GSEC
CI - L.F.
           EURL AGA
                                                      GREENBELT . MD
                                NASA-GSEC
GI - M.H.
          ACUNA
```

EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INVESTIGATE THE MAGNETIC FIELDS OF JUPITER AND SATURN. THE SOLAR WIND INTERACTION WITH THE MAGNETOSPHERES OF THESE PLANETS, AND THE INTERPLANETARY MAGNETIC FIELD TO THE EXTENT OF THE SOLAR WIND BOUNCARY WITH THE INTERSTELLAR MAGNETIC FIELD, AND BEYOND. IF CROSSED, THE INVESTIGATION WILL BE CARRIED OUT USING TWO HIGH-FIELD AND TWO LOW-FIELD TRIAXIAL FLUXGATE MAGNETOMETERS. DATA ACCURACY OF THE INTERPLANETARY FIELDS WILL BE FLUS OR MINUS 0.1 GAMMA, AND THE RANGE OF MEASUREMENTS WILL BE FROM 0.01 GAMMA TO 20 GAUSS. THE INSTRUMENTATION WILL WEIGH 5.8 KG AND CONSUME 5.2 WATTS.

ON 11/20/72. THE SPACECRAFT MISSIGN WAS APPROVED.

#### EXPERIMENT NAME- PLASMA

NSSDC ID MARN778-06

EXPER IMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CIECTHER INVESTIGATORA
P1 - H.S.	BRIDGE	MIT	CAMBRIDGE. MA
.L.A - IO	LAZARUS	MIT	CAMBRIDGE. MA
01 - s.	OLBERT	MIT	CAMERIDGE, MA
OI - J.W.	BELCHER	MIT	CAMBRIDGE. NA
OI - V.M.	VASYL IUNAS	MIT	CAMBRIDGE, MA
01 - L.F.	BURLAGA	NASA-GSFC	GREENEELT, ND
01 - J.H.	BINSACK	MIT	CAMBRIDGE , NA
01 - G.L. 01 - A.J.	S IS COE	U OF CALIFORNIA.	
OI - M.J.	HUNCHAUSEN	NATE CNTR ATMOS F	RSCH BEULDER, CO

## EXPERIMENT BRIEF DESCRIPTION

THE PLASMA INVESTIGATION WILL MAKE USE OF TWO FARADAY CUP DETECTORS. ONE POINTED ALONG THE EARTH-SPACECRAFT LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE EARTH-FOINTING DETECTOR WILL DETERMINE THE MACROSCOPIC PROPERTIES OF THE PLASMA IONS. DBTAINING ACCURATE VALUES OF THEIR VELOCITY, DENSITIES. AND PRESSURE. THREE SEQUENTIAL ENERGY SCANS WILL BE EMPLOYED WITH DELTA EVE EQUAL TO 29. 7.2, AND 1.8 PERCENT, ALLOWING A COVERAGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLOW. THE SIDE-LOOKING FARADAY CUF WILL MAKE MEASUREMENTS OF ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV. THE INSTRUMENT WILL WEIGH 5.5 KG AND USE 6.5 % OF POWER.

ON 11/20/72. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY CHARGED PARTICLE ANALYZER AND NSSDC ID WARN778-07 TELESCOPE

EXPERIMENT	PERSONNEL	(FI=PRINCIPAL INVESTIGATOR. CI=C	THER INVESTIGATED
PI - S.M.	KRIMIGIS	APPLIED PHYSICS LAB	SILVER SERING MO
OI - R.E.	HARTLE	NASA-GSFC	GREENEELT, MC
01 - K•W•	OCILVIE	NASA-GSFC	GREENBELT. NO
•6•0, <b>– 10</b>	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, ME
01 - T.P.	ARMSTRONG	U OF KANSAS	LAWRENCE, KS
OI - w.I.	AXFORD	L OF CALIFORNIA, SC	SAN DIEGO, CA
OI - G.	GLICECKLER	U OF MARYLAND	COLLEGE FARK, ND
0I - L.j.	LANZEROTTI	BELL TELEPHONE LAB	MURRAY HILL, NJ
DI - C.Y.	FAN	L OF ARIZONA	TICSCN AZ

## EXPERIMENT BRIEF DESCRIPTION

THE DBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE MAGNETOSPHERES OF JUPITER AND SATURN USING A LOW-ENERGY MAGNETOSPHERIC PARTICLE ANALYZER.

THIS DETECTOR WILL MAKE MEASUREMENTS (1) IN THE DISTANT MAGNETOSPHERE AND BOW SHOCK OF JUDITER. (2) THE POSSIBLE MAGNETOSPHERE OF SATURN, AND (3) THE TRAPPED RADIATION BELTS IN THE VICINITY OF JUPITER. ADDITIONALLY, THIS DETECTOR WILL BE ABLE TO STUDY LOW-ENERGY PARTICLES IN THE INTERPLANETARY MEDIUM. THE ENERGY RANGE OF THIS CETECTOR WILL BE 10 KEV TO 1.1 MEV FOR ELECTRONS AND 10 KEV TO 150 MEV FOR IONS. DURING THE INTERPLANETARY CRUISE PERIOD, PROTONS, ALPHA FARTICLES, AND HEAVIER NUCLEI (2 FROM 3 TO 26) WILL BE SEPARATELY IDENTIFIED AND THEIR ENERGY MEASURED IN THE RANGE FROM 0.05 TO 30 MEV USING A LOW-ENERGY PARTICLE TELESCOPE. HOWEVER, SELECTION OF THE LUW-ENERGY TELESCOPE IS CONDITIONAL ON DEMONSTRATING THE PRODUCTION OF SUFFICIENTLY UNIFORM DETECTORS TO EFFECT THE SEPARATION OF THE NUCLEI IN THE LOW-ENERGY END OF THE PROPOSED INVESTIGATION RANGE (LESS THAN 1.8 MEV/NUCLEGN) +

EN 11/20/72. THE SPACECRAFT MISSION WAS APPRICAD.

EXPERIMENT NAME- HIGH- AND MODERATELY LOW-ENERGY NSSDC 10 MARN778-08 COSMIC-RAY TELESCOPE

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) CAL TECH V:1GT PI - R.E. PASADENA, CA CAL TECH JOKIPII 01 - J.R. PASADENA. CA STONE CAL TECH GI - E.C. NASA-GSFC GREENEELT. MD 01 - F.B. MCD::NALD GREENBELT, MD NASA-GSFC GI - 8.J. TEEGARDEN GREENEELT. MD NASA-GSFC OI - J.H.
OI - W.R. TRAINCE U OF NEW PANESHIRE CURHAM. NH WEBBER

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO DETERMINE THE ENERGY AND IDENTITY OF NUCLEI. FOR ENERGIES BETWEEN 6 AND ECC MEV AND NUCLEI RANGING IN ATOMIC NUMBER FROM 1 THROUGH 30. USING A HIGH-ENERGY TELESCOPE. IN ACDITION, THIS TELESCOPE WILL MEASURE ELECTRONS OF ENERGIES FROM 3 TO 10 MEV. THE ENERGY AND IDENTITY OF NUCLEI WILL BE DETERMINED WITH ENERGIES BETWEEN 0.15 AND 30 MEY AND ATOMIC NUMBERS FROM 1 THROUGH 30, USING A LINETERRRY TELESCOPE. THESE MEASUREMENTS WILL ALLOW AN UNDERSTANDING (1) OF THE NUCLEOSYNTHESIS OF ELEMENTS IN COSMIC-RAY SOURCES AND (2) OF THE DRIGIN AND ASSOCIATED ACCELERATION PROCESS AS WELL AS THE LIFE HISTORY AND DYNAMIC CONTRIBUTION OF COSMIC FAYS IN THE GALAXY. IN ADDITION. THE TRAPPED PLANETARY ENERGETIC PARTICLE ENVIRONMENT WILL BE STUDIED. THESE MEASUREMENTS WILL ALSO ALLOW AN UNDERSTANDING OF THE MODULATION OF COSMIC RAYS OVER AN EXTENDED REGION OF INTERPLANETARY SPACE.

ON 11/20/72. THE SPACECRAFT MISSICH WAS AFFREVED.

EXPERIMENT NAME- INTERPLANETARY DUST PARTICLE MEASUREMENT ASSEC 10 MARN77E-09

EXPERIMENT PERSONNEL (FIEPRINCIPAL INVESTIGATOR: CIECTFER INVESTIGATOR) DREXEL INST OF TECH PHILADELPHIA . PA SOBLEMAN PI - K.K. SWEDEN U OF LUND CI - B.A. LINCELAC W. GERNANY NAX PLANCK INST 01 - E. CRUM DREXEL INST OF TECH PHILADELPHIA, FA HOUSE 01 - F.H. W.PLANCK INST. HEIDFLEG REIDELBERG. W. GERMANY OI - H. FECHTIG

EXPERIMENT BRIEF DESCRIFTION

PARTICLE MEASUREMENTS WILL BE NACE USING THE SISYPHUS CONCEPT. IN WHICH SOLAR RACIATION REFLECTED FROM THE PARTICLE IS USED FOR DETECTION. RANGE, AND VELOCITY DETERMINATION. FOUR OPTICAL SYSTEMS HAVING OVERLAPPING CONICAL FIELDS OF VIEW WILL DETECT SUNLIT PARTICLES PASSING THROUGH THE UVERLAP REGION. THE TIMES OF ENTRANCE INTO AND EXIT FROM THE COMES WILL BE USED TO DETERMINE COMPLETELY THE PARTICLE'S TRAJECTORY RELATIVE TO THE INSTRUMENT AND ITS CREIT IN THE SULAR SYSTEM. THIS INSTRUMENT WILL BE SIMILAR TO THE ONE BEING FLOWN ON PICNEER 10. THE FIELDS OF VIEW WILL BE 2-DEG HALF-ANGLE. AND THE MIRRORS WILL BE 20 CM IN DIAM. THE MINIMUM DETECTIBLE PARTICLE RACIUS AT 1 AL WILL BE APPROXIMATELY 5 MICRONS. THIS WILL INCREASE TO ABOUT 25 MICRONS AT 10 AU. LIGHT FLASH AND ACOUSTICAL MEASUREMENTS OF FARTICLE IMPACT WILL ALSO BE INCLUDED.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - SWEEP FREQUENCY (.C2 TO 40 MHZ) RADIC NSSDC ID MARN77E-10
RECEIVER

EXPERIMENT PERSONNEL (PI=PPINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) PI - J.W. WARWICK U OF COLORADO BOULDER, CO 01 - w.E. BROWN NASA-JPL PASACENA, CA CI - 5. GULK IS NASA-JPL PASADENA . CA 01 - C.C. HARVEY MEUDON GESERVATORY PARIS. FRANCE 01 - Y. LEBLANC MEUDON DESERVATORY PARIS, FRANCE 01 - D.H. STAELIN MIT CAMBRIDGE . NA .A - 10 BOISCHOT MEUDON COSERVATORY PARIS. FRANCE 01 - T.D. CARR U OF FLORICA GAINSVILLE, FL DI - F.T. HADDOCK U CF MICHIGAN ANN ARBOR, MI 01 - J.K. ALEXANDER, JR. NASA~GSFC GREENBELT, MD 01 - R. PHILL IPS NASA - JPL PASADENA. CA

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A SWEEP FREQUENCY RADIO RECEIVER UPERATING IN BOTH POLARIZATION STATES, ESTWEEN 20 KHZ AND 40.5 MHZ. THE SIGNAL WILL BE RECEIVED BY A PAIR OF CRITICGONAL 16-M MCNOFCLE ANTENNAS. THE PHYSICS OF MAGNETOSPHERIC PLASMA RESONANCES AND THERMAL RADIO EMISSIONS FROM THESE PLANETARY REGIONS WILL BE STUDIED BY INVESTIGATION OF THE RACIC EMISSION SIGNALS FROM JUPITER AND SATURA OVER THIS RANGE OF FREGUENCIES.

EN 11/20/72, THE SPACECRAFT MISSICH WAS AFFREVED.

EXPERIMENT NAME - NULTIFILTER PHOTOPOLARIMETER, ASS 2200-7300 A

NSSCC IC WARN77E-11

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - C+F. LILLIE U OF COLORADO BOULDER. CO
OI - C+W+ HORD U OF COLORADO BOULDER. CO
OI - K+ PANG U OF COLORADO BOULDER. CO

#### EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT WILL CONSIST OF AN 8-IN- F/1-1 TELESCOPE, WHICH WILL SEND ITS OBSERVATIONS THROUGH A POLARIZER AND A FILTER FOR ONE OF EIGHT BANDS IN THE 2200- TO 7300-A SPECTRAL REGION. THEN ON TO A PHOTOMULTIPLER TUBE. BY STUDY OF THESE EMISSION INTENSITY DATA, INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF EOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH INFORMATION OF SIZE DISTRIBUTION AND CONFOSITION OF

SATURN'S RINGS, AND INFORMATION ON ATMOSPHERIC SCATTERING PROFERTIES AND DENSITY FOR BOTH PLANETS . MOLECULAR SCALE HEIGHTS FOR BOTH PLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

ON 11/20/72. THE SPACECRAFT MISSICH WAS APPROVED.

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SPACECRAFT COMMON NAME- MOTHER

NSSDC ID MOTHER

IMP-K, IME-M ALTERNATE NAMES-

SPACECRAFT WEIGHT IN ORBIT-270. KG PLANNED LAUNCH DATE- 11/00/77

LAUNCH SITE- CAPE KENNECY, UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

NASA-OSS UNITED STATES ESRO INTERNATIONAL

PLANNED ORBIT PARAMETERS

MIN ORBIT PERICO-

ORBIT TYPE- GEOCENTRIC PERIAPSIS- 500. KW ALT INCLINATION-28 . DEG APGAPSIS- 131000. KM ALT

SPACECRAFT PERSONNEL (PM=PRDJECT MANAGER, PS=FRCJECT SCIENTIST)

GREENBELT, MD NASA-GSFC MADDEN -L.L - M9 GREENEELT. NC NASA-GSFC PS - J.H. TRAINOR WASHINGTON. DC NA SA - GSFC PS - K. OGILVIE

# SPACECRAFT BRIEF DESCRIPTION

THE EXPLORER CLASS MOTHER SPACECRAFT WILL BE PART OF THE MOTHER/DAUGHTER/FEL IOCENTRIC MISSION. THE PURPOSES OF THE MISSION WILL BE --(1) TO INVESTIGATE SOLAR/TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE. (2) TO E MAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR THE EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SQLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE MOTHER/DAUGHTER PORTION OF THE MISSION WILL CONSIST OF TWO SPACECRAFT WITH A STATION-KEEPING CAPABILITY IN A HIGHLY ECCENTRIC EARTH ORBIT WITH APOGEE FROM 18 TO 23 EARTH RACII. THE SPACECRAFT WILL MAINTAIN A SMALL SEPARATION DISTANCE, AND WILL MAKE SIMULTANEOUS COURDINATED MEASUREMENTS TO PERMIT SEPARATION OF SPATIAL FROM TEMPORAL IRREGULARITIES IN THE NEAR-EARTH SOLAR WIND, THE BOW SHOCK, AND INSIDE THE MAGNETICS PERES

ON 01/09/73, THE SPACECRAFT MISSICH WAS PROFESED.

NSSDC ID MCTHER -01 EXPERIMENT NAME- 50-EV TO 40-KEV PROTON AND E-EV TO 20-KEV ELECTRON PLASMA PROBE

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) LCS ALAMOS SCI LAB LCS ALAMOS, NM

P1 - S.J. BAME GE RMANY MAX PLANCK INST 01 - H. MIGGENRIEDER GERNANY MAX PLANCK INST SCHINDLER

CI - K. LCS ALAMOS SCI LAB LOS ALANCS, NM OI - J.R. ASBRIDGE

OI - H.R. ROSENEAUER M.PLANCK INST.GARCHING GARCHING, W. GERMANY OI - H. VOLK M.PLANCK INST. GARCHING GARCHING. W. GERMANY 01 - M.D. MONT GOMERY LOS ALAMOS SCI LAB LOS ALAMOS. NM OI - G. PASCHMANN MAX PLANCK INST GERMANY OI - W. C. FELDMAN NASA-ARC MOFFETT FIELD. CA 01 - E.W. HONES LOS ALAMOS SCI LAB LOS ALAMOS, NM

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED. IN CONJUNCTION WITH A SIMILAR INSTRUMENT PROVIDED BY G. PASCHMANN OF MAX PLANCK INSTITUTE FOR FLIGHT ON THE DAUGHTER SPACECRAFT. TO STUDY THE PLASMA VELOCITY DISTRIBUTION AND ITS SPATIAL AND TEMPORAL VARIATIONS IN THE SOLAR WIND, BOW SHOCK, MAGNETOSHEATH.

MAGNETOPAUSE. MAGNETOTAIL, AND MAGNETOSHERE. PROTONS FROM 50 EV TO 40 KEV AND ELECTRONS FROM 5 EV TO 20 KEV WILL BE MEASURED IN ONE. TWO. AND THREE DIMENSIONS BY THREE 90-DEG SPHERICAL ELECTROSTATIC ANALYZERS. THE EXPERIMENT. WHICH WILL UTILIZE CHANNELTRON ELECTRON MULTIPLIERS AS DETECTORS, WILL OPERATE IN TWO RANGES, WITH ENERGY RESOLUTION FOR SEVERAL STEPS IN EACH RANGE OF 10 PERCENT OF THE CENTER ENERGY LEVEL.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- THREE-CIMENSIONAL (SIX AXIS), 6-EV TC NSSCC ID MCTHEF -02 10-KEV ELECTRON SPECTROMETER

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR)
PI - K.W. OGILVIE NASA-GSFC GREENBELT, MD
DI - J.C. SCUDDER NASA-GSFC GREENEELT, MD

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO STUDY THE TRANSPORT CCEFFICIENTS OF. AND TURBULENCE IN. THE COLLISIONLESS PLASMA REPRESENTED BY THE INTERPLANETARY MEDIUM AND MAGNETUSHEATH, LOW-ENERGY SCLAR ELECTRON EVENTS, AND BOW SHOCK ASSOCIATED ELECTRONS. TWO TRIAXIAL SYSTEMS OF 127-CEG CYLINCRICAL ELECTRONSTATIC ANALYZERS WILL BE USED TO MAKE THREE-DIMENSIONAL MEASUREMENTS OF THE ELECTRON DISTRIBUTION FUNCTION FROM 6 EV TO 10 KEV. MEASUREMENTS WILL BE MADE IN TWO ENERGY RANGES WITH AN ENERGY RESOLUTION OF 0.07. THE ENTIRE SET OF SIX SIMULTANEOUS SPECTROMETER MEASUREMENTS WILL BE TAKEN WHILE THE SATELLITE ROTATES THROUGH 60 DEG. EACH SPECTROMETER AXIS WILL CONSIST OF THE CURVED PLATE ANALYZER AND A CHANNELTRON DETECTOR.

ON 01/09/73, THE SPACECRAFT MISSICN WAS PROFESED.

EXPERIMENT NAME- HOT PLASMA

NSSDC ID MOTHER -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)

PI - L.A. FRANK U OF IOWA , IOWA CITY, IA

OI - V.M. VASYLIUNAS MIT CAMERIDGE, MA

OI - C.F. KENNEL U OF CALIFCRNIA, LA LCS ANGELES, CA

## EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT. THE SPATIAL AND TEMPORAL VARIATIONS OF THE SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND IGNS. PROTONS AND ELECTRONS IN THE ENERGY RANGE FROM 1 EV TO 50 KEV WILL BE MEASURED IN 63 CONTIGUOUS ENERGY BANCS WITH AN ENERGY RESOLUTION (DELTA E/E) OF 0.17. A

QUADRISPHERICAL LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA). EMPLOYING SEVEN CONTINUOUS CHANNEL ELECTRON MULTIPLIERS IN EACH OF ITS TWO (ONE FOR PROTONS AND ONE FOR ELECTRONS) ELECTROSTATIC ANALYZERS. WILL BE FLOWN ON BOTH THE MOTHER AND DALGHTER SPACECRAFT. ALL BUT 2 PERCENT OF THE FOUR-PI STER SOLID ANGLE FOR PARTICLE VELOCITY VECTORS WILL BE COVERED.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME - MAGNETIC FIELDS

NSSCC IC MOTHER -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) OI=OTHER INVESTIGATOR)

PI - C+T+ RUSSELL U CF CALIFCRNIA+ LA LCS ANGELES+ CA

OI - R+L+ MCPHERFCN U UF CALIFCRNIA+ LA LOS ANGELES+ CA

OI - FEDGECOCK IMPERIAL COLLEGE LONDON+ ENGLAND

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A BCCM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER THAT WILL NEASURE THE STEADY NAGNETIC FIELD AND ITS LOW-FREQUENCY VAPIATIONS. THREE FIELD AMPLITUDE RANGES (MINUS TO FLUS 16. 64. AND 2048 GAMMAS) WILL BE AVAILABLE WITH RESOLUTION OF MINUS TO PLUS 1/32. 1/4. AND 1/16 GAMMA. RESPECTIVELY. THE FREQUENCY RESPONSE WILL BE 0 TO 10 Hz. AN IDENTICAL INSTRUMENT IS TO BE FLOWN ON THE DAUGHTER SPACECRAFT. PERMITTING SEPARATION OF TEMPORAL AND SPATIAL MAGNETIC FLUCTUATIONS.

ON 01/09/73. THE SPACECRAFT MISSICN WAS PROFESED.

EXPERIMENT NAME- LOW-ENERGY COSMIC-RAY COMPOSITION

NESDC ID MOTHER -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) M.PLANCK INST.GARCHING GARCHING. W. GERMANY HOVESTACT PT - DaKa U UF MARYLAND COLLEGE PARK, MD 01 - J.J. OF GALLAGHER M.PLANCK INST.GARCHING GARCHING, W. GERMANY SCHOLER GI - M. GREENEELT. MD 01 - L.A. NA SA - GSFC FISK TUCSON: AZ 01 - C.Y. FAN U OF ARIZONA U OF MARYLAND CCLLEGE FARK, MD GLUECKLER 01 - G.

## EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE HELIOCENTRIC AND MOTHER SPACEGRAFT. THE NUCLEAR AND IDNIC CHARGE AS WELL AS ISOTOPIC COMPOSITION OF INTERPLANETARY AND MAGNETUSPHERIC HEAVY PARTICLES. THE MEASUREMENTS WILL BE MACE OF THE FOLLOWING SPECIES IN THE DESIGNATED RANGES —— (1) SOLAR WIND IRON (5 KEV/CHARGE TO 20 MEV/NUCLEON). (2) SUPRATHERMAL MULTIPLE—CHARGED IONS (Z. Q LESS THAN UR EQUIL TO 26 IN THE ENERGY RANGE 5 TO 50 KEV/NUCLEON). AND (3) TPAPPED PARTICLES (0.05 TO 6 MEV/NUCLEON). THE INSTRUMENTATION WILL CONSIST OF TWO SENSORS ON EACH SPACEGRAFT WHICH WILL USE ELECTROSTATIC DEFLECTION TECHNIQUES. THIN WINDOW PROPORTIONAL COUNTERS. AND FOSITION—SENSITIVE SOLID—STATE DETECTORS. THE SENSORS WILL HAVE LARGE GEOMETRICAL FACTORS CYER THE ENTIRE ENERGY RANGE. I.E.. 0.04 CM SQ STER FOR THERMAL AND SUPRATHERMAL SOLAR WIND MEASUREMENTS. AND 3 CM SQ STER FOR LCW ENERGY COSMIC RAY ME ASUREMENTS.

ON 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- DC TO 12-FZ ELECTRIC FIELD PROBE NSSCC 10 NOTHER -06

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	DI = DTHER INVESTIGATOR)
PI - F.S.	MOZER	U OF CALIFORNIA,	BERK BERKELEY. CA
OI - M.C.	KELLEY	U OF CALIFORNIA.	BERK EERKELEY. CA
OI - U.V.	FAHLESON	RIT	SWEDEN
GI - K.	KNOTT	EUR SFACE TECH CE	NTER NOORDWIJK, THE NETHERLANDS
01 - A.	PETERSEN	EUR SPACE TECH CE	NTER NOGROWIJK, THE NETHERLANDS

#### EXPERIMENT ERIEF DESCRIFTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE QUASI-STATIC ELECTRIC FIELD IN THE PLASMASPHERE, MAGNETOSPHERE, MAGNETOSPEATH, AND SOLAR WIND: THE 4-IN--CIAM SPHERES WILL BE MOUNTED AT THE END OF A 30-M BOOM IN THE SATELLITE SPIN PLANE. TO ATTEMPT TO OVERCOME THE SPACECRAFT SHEATH (A POTENTIAL PROBLEM WHICH PLAGUES MOST ELECTRIC FIELD DETECTORS). AN ELECTRON GUN IS INCLUDED ON THE SPACECRAFT BODY. THE INSTRUMENT IS TO BE SENSITIVE TO FIELDS FROM THRESHOLD TO 5 MV/M IN THE FREQUENCY BAND OF 0 TO 12 HZ.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TC ASSCC ID MOTHER -07 200-KHZ ELECTRIC FIELD TRIAXIAL FROBES

EXPERIMENT	PERSCNNEL	(PI≈PRINCIPAL INVESTIGATOR, CI≈C	THER INVESTIGATOR)
PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - F.L.	SCARF	TRW SYSTEMS GROUP	RECONCE BEACH, CA
01 - R.W.	FREDERICKS	TRW SYSTEMS GROLP	RECONDO EEACH, CA
.L.3 - 10	SMITH	NASA-JPL	PASADENA, CA

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT, IN CONJUNCTION WITH A SIMILAR EXPERIMENT FLOWN ON THE DAUGHTER SPACECRAFT. IS DESIGNED TO MEASURE WAVE PHENCHENA CCCURRING WITHIN THE MAGNETOSPHERE AND SOLAR WIND. TRIAXIAL SEARCH COILS WITH HIGH-PERMEABILITY CORES AND TRIAXIAL ELECTRIC DIPOLES WILL BE USED. THE SEARCH COILS WILL HAVE A PREQUENCY RESPONSE OF 10 HZ TO 10 KHZ. THE TIME REQUIRED FOR ONE 16-CHANNEL TRIAXIAL SPECTRUM ANALYSIS WILL BE 100 MS. BROADEAND DATA WILL ALSO BE AVAILABLE WITH A 10 KHZ BANDWIDTH ABOUT EVERY 1 MS. ELECTRIC FIELDS WILL BE MEASURED BY TWO ORTHOGONAL 123-M TIP-TC-TIP DIPOLES IN THE SPACECRAFT SPIN PLANE AND ONE C.5-M DIPOLE ALONG THE SPIN AXIS. THE TIME REQUIRED FOR TRIAXIAL 12-CHANNEL SPECTRUM ANALYSIS FROM 10 HZ TO 200 KHZ WILL ALSO BE 100 MS. BROADEANC CATA WILL ALSO BE AVAILABLE WITH A 10-KHZ BANDWIDTH AND 1-MS TIME RESOLUTION.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- IMPEDANCE PROBE AND RACIO FROPAGATION - NSSCC ID NOTHER -08 TRANSMITTER

EXPERIMENT PERSONNEL (PI = PRINCIPAL INVESTIGATOR, OI= (THEF INVESTIGATOR) PI - C.C. HARVEY PARIS DESERVATORY PARIS, FRANCE

FARIS. FRANCE CNET PETIT 01 - M. NOAA BOLLDER, CC MCAFEE 01 - J.R. EUR SPACE TECH CENTER NOORDWIJK. THE NETHERLANDS OI - D. JONES PARIS. FRANCE DI - J.M. CNET EUR SPACE TECH CENTER NOORDWIJK . THE NETHERLANDS OI - R.J.L. GRARD GENDRIN CNET PARIS, FRANCE OI - R.

## EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT WILL COSEFVE THE PLASMA DENSITY NEAR THE MOTHER SATELLITE, AND WILL ALSO OBSERVE THE TOTAL ELECTRON CONTENT IN THE WAGNETOSPHERE EETWEEN THE MOTHER AND THE DAUGHTER SATELLITES. THESE DATA WILL ALLOW STUDY OF THE TIME AND SPACE VARIATIONS OF ELECTRON DENSITY IN THE MAGNETOSPHERE. THE EXPERIMENT WILL CONSIST OF TWO DISTINCT PARTS. THE MOTHER SATELLITE WILL CARRY A RESONANCE PROBE TO MEASURE LOCAL ELECTRON DENSITY. A RESCHANCE PROBE TYPICALLY OBSERVES THE CURRENT FLOWING TO AN ELECTRODE FROM SPACE. WHEN THE ELECTRODE HAS AN RF VOLTAGE IMPRESSED ON ITS FUNDAMENTAL DC VOLTAGE, THE CURRENT WILL DEVIATE FROM ITS VALUE DESERVED FOR THE DC VOLTAGE WITHOUT THE IMPRESSED RF. WHEN THE RF IS VARIED THROUGH A RANGE OF VALUES. A MAXIMUM DEVIATION OF CURRENT OCCURS WHEN THE RE EQUALS THE PLASMA FREQUENCY. THE ELECTRON DENSITY IS DIRECTLY OBTAINED FROM THE RE VALUE WHEN THE CURRENT DEVIATION IS MAXIMUM. THE RE THAT CAN BE USED FOR THIS EXPERIMENT WILL RANGE FROM O TO 256 KHZ, WHICH WILL MEASURE ELECTRON NUMBER CENSITIES UP TO 3200/CC. THE SECOND PART OF THIS EXPERIMENT WILL CONSIST OF AN RE TRANSMITTER ON THE NOTHER AND A RECEIVER ON THE DAUGHTER. THE TRANSMITTER WILL EMIT SIGNALS WITH A KNOWN PHASE RELATIONSHIP, AT TWO CLOSELY SPACED FREQUENCIES NEAR 300 MHZ. THE RELATIVE PHASE DELAY OF THE LOWER FREQUENCY WILL BE DESERVED BY THE DAUGHTER RECEIVER. THE PHASE DELAY IS CAUSED BY THE DIFFERENT EFFECT OF THE ELECTRONS ALONG THE PROPAGATION PATH. ON THE TWO DIFFERENT SIGNAL FREQUENCIES INVOLVED. THESE PHASE CELAY DATA CAN BE CONVERTED INTO TOTAL ELECTRON CONTENT BETWEEN THE TWO SPACECRAFT. AND THEN NORMALIZED TO A STANDARD PATH LENGTH.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NESEC 10 MOTHER -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI#CTHER INVESTIGATOR) PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO APPLIED PHYSICS LAE OI - C.G. BOSTROM SILVER SFRING, MC eB - 10 M&PLANCK INSTALINDAU LINDAL, GERMANY WILKEN GI - T.A. BOULDER, CO FRITZ NOAA 01 - G. WISHERENZ U OF KIEL LINCAL, No GERMANY 01 - E. KEPPLER M .PLANCK INST.LINDAU LINDAL, W. GERMANY

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO IDENTIFY AND TO STUDY PLASMA
INSTABILITIES RESPONSIBLE FOR ACCELERATION, SOURCE AND LOSS MECHANISMS. AND
BOUNDARY AND INTERFACE PHENDMENA THROUGHOUT THE CREITAL RANGE OF THE
MOTHER/DAUGHTER SATELLITES. A PROTON TELESCOPE AND AN ELECTRON SPECTROMETER
WILL BE FLOWN ON EACH SPACECRAFT TO MEASURE DETAILED ENERGY SFECTRUM AND
ANGULAR DISTRIBUTIONS. THESE DETECTORS WILL USE SILICON SURFACE EARRIER
TOTALLY-DEPLETED SOLID-STATE DEVICES OF VARIOUS THICKNESSES. AREAS. AND
CONFIGURATIONS. PROTONS IN 6 CHANNELS BETWEEN 20 KEV AND 2 MEV. AND
ELECTRONS IN 8 CHANNELS BETWEEN 20 KEV AND 1 MEV WILL BE MEASURED.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT	PERSONNEL	(PIRPRINCIPAL INVESTIGATOR	01=01	THER INVESTIGATORY
LT V • W •	ANDERSON	U OF CALIFORNIA	BERK	BERKELEY. CA
OI - C.I.	MENG	U OF CALIFORNIA		
01 - F.V.	CORONITI	U OF CALIFORNIA.		LOS ANGELES. CA
01 - J.M.	BOSQUEC	PAUL SABATIER U		TOLLOUSE . FRANCE
01 - R.	PELLAT	PAUL SABATIER U		TOULOUSE. FRANCE
<b>QI -</b> G.K.	PARKS	U UF WASHINGTON		SEATTLE. WA
DI - R.P.	LIN	U OF CALIFORNIA.	BERK	BERKELEY. CA
OI - H.	REME	PAUL SABATIER U		TCULCUSE, FRANCE

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE. BY USING IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT. THE SPATIAL EXTENT. PROPAGATION VELOCITY. AND TEMPORAL BEHAVIOR OF A BICE VARIETY OF PARTICLE PHENOMENA. ELECTIONS ARE TO BE MEASURED IN TWO INTERVALS OVER THE ENERGY RANGE FROM B TO 200 KEV. AND PROTONS ARE TO BE MEASURED IN THREE INTERVALS OVER THE ENERGY RANGE FROM 10 TO 3EC KEV. IDENTICAL INSTRUMENTATION ON EACH SPACECRAFT WILL CONSIST OF A PAIR OF SURFACE BARRIER SEMICOLOUCTER DETECTOR TELESCOPES (ONE WITH A FOIL AND ONE WITHOUT A FOIL) AND FOUR FIXED—ENERGY ELECTRIC FIELD FARTICLE ANALYZERS. THESE ANALYZERS WILL BE USED TO MEASURE ELECTRONS AND PROTONS SEPARATELY AT 2 AND 6 KEV.

ON 01/09/73, THE SPACECRAFT WISSICN WAS PROPOSED.

EXPERIMENT NAME- DC ELECTRIC FIELDS

NESCC IC MOTHER -11

EXPERIMENT PERS	UNNEL (PI=PRINCIPAL	INVESTIGATOR. DIE	ETHER INVESTIGATI	ne s
PI - J.P. HEPI		SA-GSFC	GREENBELT. NO	
GI - T.L. AGGS	SON NA	SA-GSFC	GREENBELT, MD	
	NARC NA	SA-GSFC	GREENEELT. NO	
= : '	NETT U I	OF IOWA	IDWA CITY. IA	
OI - D.A. CAU	FFMAN AEI	ROSPACE CORP	EL SEGUNDO. CA	A

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO STUDY QUASI-STATIC ELECTRIC FIELD AND LOW-FREQUENCY PLASMA WAVES IN THE PLASMASPHERE, MAGNETUSPIERE. MAGNETOSHEATH, AND SOLAR WIND. A 165-M TIF-TO-TIP DIPOLE ANTENNA WILL BE USED TO MAKE DO AND AC ELECTRIC FIELD MEASUREMENTS IN THE FOLLOWING NINE FREQUENCY WINDOWS -- 0.1 TO 0.32 HZ, 0.32 TO 1 HZ, 1 TO 3.2 HZ, 3.2 TO 10 HZ. 10 TO 32 HZ. 32 TO 100 FZ. 100 TO 320 HZ. 320 TO 1000 HZ. AND 1000 TO 3200 HZ. DC MEASUREMENTS WILL BE MADE IN ANY DE 256 ANGULAR SECTIONS THREE TIMES OR 24 TIMES PER SEC. DEPENDING ON THE BIT RATE. DC MODE MEASUREMENTS WILL HAVE A TWO-STEP VARIABLE GAIN CONTROLLED FROM THE GROUND. THE RESOLUTION IN THE HIGHEST GAIN STATE WILL BE 0.12 NV WITH A DYNAMIC RANGE OF PLUS OR MINUS 0.583 V. THE AC MEASUREMENT ELECTRONICS WILL CONSIST OF TWO AMPLIFIER SECTIONS. DNE AMPLIFIER WILL BE USED FOR LOW-FREQUENCY CHANNELS. AND ONE FOR HIGH-FREQUENCY CHANNELS. GAIN FOR EACH AMPLIFIER WILL BE CONTROLLABLE INDEPENDENTLY FROM THE GROUND. IN THE HIGHEST GAIN MODE, EACH ANALYZER CHANNEL WILL HAVE A SENSITIVITY OF 0.6 MICROVOLTE RMS. THE EXPERIMENT CAN EE RUN IN EITHER A SUN-SENSOR SYNCHRONIZED OR FREE STATE AS CONTROLLED FROM THE GROUND. IN ADDITION: THE AC PORTION CAN BE RUN IN AN

AVERAGING MODE. CR AN ALTERNATING AVERAGING AND PEAK AMPLITUDE DETECTION MODE PER TELEMETRY READULT SEQUENCE.

ON 01/09/73, THE SPACECRAFT MISSICH WAS PROFICED.

EXPERIMENT NAME- PLASMA COMPOSITION

NSSOC ID MOTHER -12

EXPERIMENT PERSONNEL PI - R.O. SHAFP OI - G. HAECENDEL OI - H.R. ROSENEAUE OI - R.G. JOHNSON GI - E.G. SHELLEY OI - J. GEISS OI - P.X. EBERHARCT OI - H. BALSIGER	LOCKHEED  M.PLANCK INST.GARCHING  M.PLANCK INST.GARCHING  LOCKHEED  LOCKHEED  U CF BERNE	GARCHING, W. GERMANY
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# EXPERIMENT ERIEF DESCRIPTION

THE DEJECTIVE OF THIS INVESTIGATION WILL BE TO DETERMINE THE ION COMPUSITION AND ENERGY SPECTRA OF THE PLASMA WITHIN THE MAGNETOSPHERE. MAGNETOSHEATH, AND SOLAR WIND, AND TO DETERMINE THE ANGULAR DISTRIBUTION OF THE PLASMA IN THE MAGNETUSHEATH. AN ENERGETIC ILA MASS SPECTROMETER WILL BE FLOWN THAT WILL FAVE AN ELECTROSTATIC ENERGY ANALYZER FOLLOWED BY A CEMBINED CYLINDRICAL, ELECTROST AT IC/MAGNET IC MASS ANALYZER. A COMBINATION OF ELECTRON MULTIPLIERS WILL BE USED AS THE DETECTORS. THE ENERGY-PER-UNIT-CHARGE RANGE MEASURED WILL BE FROM D TO 40 KEV. THE MASS-PER-UNIT-CHARGE RANGE MEASURED WILL EXTEND FROM 1 TO 138 AMU.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROFESED.

EXPERIMENT NAME- VEF WAVE INJECTION

NESDC ID WOTHER -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) STANFERD. CA STANFORD U PI - R.A. HELLIWELL

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO PROVIDE DATA TO STUDY INTERACTIONS BETWEEN DISCRETE VLF WAVES AND ENERGETIC PARTICLES IN THE MAGNETOSPHERE. THE VLF WAVES WILL EE PRODUCED BY A GROUND-BASED TRANSMITTER. INJECTION OF THE WAVE BEYOND THE IONOSPHERE WILL BE ASSURED BY TRANSMITTER LOCATION IN A REGION WHERE THE MAGNETIC LINES OF FORCE ARE DPEN. IN THIS CASE SIPLE STATIUN. ANTARCTICA. THE INJECTED SIGNAL AND ANY STIMLLATED VLF EMISSIONS WILL BE RECORDED THROUGH A LOOP ANTENNA BY A 1+ 10 20-KHZ BROADEAND RECEIVER UN THE SATELLITE. THE OBSERVED PARAMETERS WILL BE INTENSITY OF RECEIVED RACID FREQUENCY AS A FUNCTION OF TIME.

EN 01/09/73. THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MEDIUM-ENERGY COSMIC RAYS

NSSDC IC MOTHER -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=OTHER INVESTIGATOR)

P1 - J.A. CHICAGE, IL SIMPSON U OF CHICAGE .M.D - 10 MASON U OF CHICAGE CHICAGO, IL 8. - B. CARTWRIGHT U. OF CHICAGO CHICAGO. IL OI - M.G. L OF CHICAGE CHICAGO. IL MUNGZ

#### EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT IS DESIGNED TO STUDY A WIDE RANGE OF INTENSITIES ENCOUNTERED IN INTERPLANETARY SPACE AND THE MAGNETOSPHERE FOR ENERGETIC COSMIC RAY NUCLEONS. THE ISCTOPES TO BE SEFARATED ARE HYDROGEN 1, HYDROGEN 2. HELIUM 3. AND HELIUM 4 FROM 10 TO 180 MEV/NUCLEON. DIFFERENTIAL ENERGY SPECTEA ARE TO SE DETAINED FOR HYDROGEN AND HELIUM FROM 0.5 TO 150 MEY/NUCLEON AND FOR LITHIUM THROUGH COBALT (2 FFOR 3 THROUGH 27) IN THE ENERGY RANGE FROM 10 TO 700 MEV/NUCLEON. THE INSTRUMENTATION WILL CONSIST OF AN EXTENDED RANGE TELESCOPE (ERT) FORMED BY A COMBINATION OF SOLID-STATE DETECTURS, A CESIUM INDIDE SCINTILLATOR, AND A PLASTIC ANTICCINCIDENCE SCINTILLATOR.

ON 01/09/73, THE SPACECRAFT MISSICH WAS PREPOSED.

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SPACECRAFT COMMON NAME- NIMBUS-F ALTERNATE NAMES-PL-7318

NESDC ID NIMBS-F

PLANNED LAUNCH CATE- 06/00/74

SPACECRAFT WEIGHT IN CREIT-

585 . KG

LAUNCH SITE- VANDENBERG AFB. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NASA-OSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERICE- 108. MIN APDAPSIS- 1100.00 KM ALT

FERIAPSIS- 1100.00 KM ALT INCLINATION-100 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FROJECT SCIENTIST)

WEILAND PM - 5. PS - W.P. NORCHERG NASA-GSEC NASA-GSEC

GREENEELT. MD GREENEELT. NO

SPACECRAFT BRIEF DESCRIPTION

THE NIMBUS-F R AND D SATELLITE WILL SERVE AS A STABILIZED. EARTH-CRIENTED FLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOPOLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT WILL CONSIST OF THREE MAJOR STRUCTURES -- (1) A HOLLOW TURUS-SHAPED SENSOR MGUNT, (2) SOLAR PADDLES, AND (3) A CONTROL HEUSING UNIT THAT IS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SUMEWHAT LIKE AN OCEAN BUDY, NIMBUS-F WILL BE NEARLY 3.7 M TALL. 1.5 M IN CLAMETER AT THE BASE. AND ABOUT 3 M WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT THAT FORMS THE SATELLITE BASE WILL HOUSE THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS WILL PROVIDE MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-BEAM STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS WILL PROVIDE SUPPORT FOR THE LARGER. SENSOP EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT. WHICH WILL BE LUCATED ON TOP OF THE SPACECRAFT. WILL BE SUN SENSORS, HORIZON SCANNERS, AND A COMMAND ANTENNA. AN ACVANCED ATTITUDE CONTROL SYSTEM WILL PERMIT THE

SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG IN ALL THREE AXES (PITCH, ROLL, AND YAW). NINE EXPERIMENTS HAVE BEEN SELECTED FOR NIMBUS-F. THEY ARE THE (1) EARTH RACIATION BUDGET (ERE). (2) ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR). (3) HIGH-RESCLUTION INFRARED RADIATION SOUNDER (HIRS). (4) LIMB RADIANCE INVERSION RADIOMETER (LRIR). (5) PRESSURE MODULATED RADIOMETER (PMR). (6) SCANNING MICREWAVE SPECTROMETER (SCAMS), (7) TEMPERATURE/HUMIDITY INFRARED RADICMETER (THIR), (8) SATELLITE TRACKING AND DATA RELAY EXPERIMENT, AND (9) TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (THERLE). THIS COMPLEMENT OF ADVANCED SENSORS WILL BE CAPABLE OF (1) MAPPING TREFCSPHERIC TEMPERATURE, WATER VAPOR ABUNCANCE, AND CLOUD WATER CONTENT, (2) PROVIDING VERTICAL PROFILES OF TEMPERATURE, OZONE. AND WATER VAPOR. (3) TRANSMITTING REAL-TIME DATA TO A GEOSTATIONARY SPACECRAFT (ATS-F). AND (4) YIELDING DATA ON THE EARTH'S RACIATION BUDGET .

ON 02/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE)

NESCC IC NIMBS-F-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) KELLOGG NATL CNTR ATMOS RSCH BOULDER, CO PI - W.W. NATL CHTR ATMOS RECH BOULDER. CC JUL IAN 01 - P. OI - V.E. U OF WISCONSIN MADISON. WI SUCMI OI - C.R. LAU GHL IN NASA-GSFC GREENBELT. MD SILVER SPRING, MC OI - R.L. TALLEY PMT GREENBELT, MD NASA- GSFC BANCEEN

## EXPERIMENT BRIEF DESCRIPTION

OI - W.R.

THE GOALS OF THE NIMBUS-F TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) WILL BE CLOSELY ASSOCIATED WITH THE OBJECTIVES OF GARP AND WILL INCLUDE (1) MEASURING UPPER ATMOSPHERIC WINDS OVER REMOTE REGIONS. (2) STUDYING THE RELATIVE AIR MOTION ALONG ISCHARIC SURFACES TO DETERMINE THE RATE OF CONVERSION OF ATMOSPHERIC FOTENTIAL ENERGY INTO KINETIC ENERGY. AND (3) PROVIDING DIRECT MEASUREMENTS OF VARIOUS METEGROLOGICAL FARAMETERS THAT CAN SERVE AS REFERENCE FCINTS IN ADJUSTING INDIRECT TEMPERATURE SOUNDINGS WADE FROM SATELLITES. THE EXPERIMENT WILL CUNSIST OF TWO BASIC COMPONENTS - (1) APPROXIMATELY 300 CONSTANT LEVEL METEOROLOGICAL EALLONS TO YIELD MEASUREMENTS OF WINDS. TEMPERATURE. AND PRESSURE IN THE TROPICS AND AT SOUTHERN HEMISPHERE MIDLATITUDES AT 150 MB (ABOUT 13.6-KM ALTITUDE). AND (2) THE NIMBUS-F RANDLM ACCESS MEASUREMENTS SYSTEM (RAMS) TO PROVIDE DATA COLLECTION AND LOCATION DETERMINATIONS FROM THE BALLOONS. THE 3.5-M-CIAM POLYESTER-NYLAR BALLOCKS WILL BE EGUIFPED WITH A TRANSMITTER PACKAGE, SOLAR POWER SUPPLY. DIGITIZER/MODULATOR. AND SENSORS. THE SENSORS WILL CONSIST OF A RADIO ALTIMETER THAT WILL HAVE AN ACCURACY OF BETTER THAN PLUS OR MINUS 20 M. A BEAD THERMISTOR THAT WILL MCNITCR THE AMBIENT AIR TEMPERATURE TO AN ACCURACY OF PLUS OR MINUS 0.5 DEG C. AND A PRESSURE SENSOR TO MEASURE THE 15C-MB FLIGHT ALTITUDE TO AN ACCURACY OF PLUS OR MINUS 0.5 MB. A MAGNETIC CUTDOWN DEVICE WILL ALSO BE INCLUDED ON EACH BALLOON TO ELIMINATE ANY ACCIDENTAL OVERFLIGHTS INTO REGIONS OF THE NORTHERN HEMISPHERE NORTH OF 20 CEG N LATITUDE. THE RAMS ON ECARD THE SPACECRAFT WILL HAVE NO COMMAND OR CONTROL CAPABILITY OVER THE BALLDONS (THE BALLCONS WILL NOT BE INTERROGATED). IT WILL MERELY DETECT EACH BALLOON SIGNAL (401.2 MHZ) AND EXTRACT THE CARRIER FREQUENCY, BALLOOM IDENTIFICATION, AND SENSOR DATA. THIS INFORMATION, ALONG WITH TIME REFERENCES, WILL BE STORED IN DIGITAL FORM FOR SUBSEQUENT RELAY TO A GROUND ACQUISITION STATION. THE BALLOON'S POSITION AND VELOCITY WILL BE DERIVED FROM THE RELATIVE MCTICN BETWEEN THE PLATFORM AND THE SATELLITE BY MEASURING COPPLER SHIFTS IN THE CARRIER SIGNAL RECEIVED

FROM THE BALLOON. TWERLE WILL BE CAPABLE OF A LECATION ACCURACY OF 5 KM AND A PLATFORM VELOCITY ACCURACY OF 1 M/SEC.

ON 02/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-RESOLUTION INFRARED RACIATION SQUNDER (HIRS)

NSSCC IC NIMBS-F-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=CTHER INVESTIGATOR)

PI - A.W. MCCULLOCH

NA SA – G SFC

GREENBELT, MD

DI - W.L. SMITH

NOAA-NESS

SUITLAND, MD

# EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F FIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS) WILL SUPPORT THE GARP DATA TEST SET BY PROVICING VERTICAL TENFERATURE PROFILES TWICE DAILY ON A GLOBAL EASIS. EXTENDING UP TO APPROXIMATELY 40 KM. AND INFORMATION ON THE WATER VAPOR DISTRIBUTION IN THE TROPOSPHERE. THE HIRS WILL MEASURE RACIANCES PRIMARILY IN FIVE SPECTRAL REGIONS -- (1) SEVEN CHANNELS NEAR THE 15-MICRON CARBON DIOXIDE ABSORPTION BAND. (2) TWO CHANNELS IN THE WATER VAPOR ABSORPTION BAND. 11.1 AND 3.7 MICRONS. (3) TWO CHANNELS IN THE WATER VAPOR CARBON DIOXIDE EARD AND 6.7 MICRONS. (4) FIVE CHANNELS IN THE 4.3-MICRON CARBON DIOXIDE EARD AND (5) ONE CHANNEL IN THE VISIBLE. 0.69-MICRON REGION. THE SOUNDER WILL CONSIST OF A CASSEGRAIN TELESCOPE. SCANNING MIRROR, DICHROMATIC BEAM SPLITTER, FILTER WHEEL, CHOPPER, AND ASSOCIATED ELECTRONICS. THE HIRS WILL SCAN THE EARTH'S SURFACE IN A PLANE ACRMAL TO THE SPACECRAFT'S ORBITAL PATH WITH A MAXIMUM SCAN ANGLE OF 30 DEG TO EITHER SIDE OF NADIR.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRICALLY SCANNING MICREWAVE RADIOMETER (ESMR)

NSSCC IC NIMBS-F-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

PI - T.T. WILHEIT, JR.

NA SA-GSFC

GREENEELT, MC

GI - A.T. EDGERTON

AEROJET ELECTROSYSTEMS AZUSA. CA

#### EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F ELECTRICALLY SCANNING MICROWAVE RACICMETER (ESMR) WILL MEASURE THE EARTH'S MICROWAVE EMISSION AT 37 GHZ. THE LIQUID WATER CONTENT OF CLOUDS, THE DISTRIBUTION AND VARIATION OF SEA ICE COVER, AND GROSS CHARACTERISTICS OF LAND SURFACES (VEGETATION, SOIL MOISTUFE, AND SNOW COVER) WILL BE OBTAINED FROM THESE MEASUREMENTS. THE DICKE-TYPE RADIOMETER WILL CONSIST OF A SINGLE TIME-SHARING RECEIVER AND AN ELECTRICALLY SCANNING PHASED ARRAY ANTENNA OPERATING AT 0.2 CM (37 GHZ). THE ANTENNA EEAM ARRAY, A 90-EY 20-BY 12-CM BOX-LIKE STRUCTURE, WILL BE MOUNTED ON TOP OF THE SPACECRAFT SENSORY RING AND WILL BE POINTED IN THE DIRECTION OF THE SPACECRAFT'S FORWARD MOTION AND TILTED DOWN 40 DEC FROM THE SATELLITE VELOCITY VECTOR. THE ANTENNA BEAM WILL SCAN THE EARTH IN 100 DISCRETE STEPS FOR VARIOUS ANGLES EXTENDING UP TO 35 DEG ON EITHER SIDE OF THE ORBITAL PLANE. THE DECUCED BRIGHTNESS TEMPERATURES SHOULD BE ACCURATE TO WITHIN 2 DEG K.

ON 02/00/68. THE SPACECRAFT MISSION WAS APPROVED.

# EXPERIMENT NAME- LIVE RADIANCE INVERSION RADICHETER - NSSC ID NIMES-F-04 (LRIR) ·

CYDERTMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, 01=01	HER INVESTIGATOR)
PI - J.C.		NATE CHTR ATMOS RICH	BOULDER, CO
OI - F.B.		CREXEL INST OF TECH	PHILACELFHIA: FA
			TALLAHASSEE. FL
CI - R.C.		FONEYWELL, AERO DIV	ST. PETERSBURG, FL
$OI - I - C_{\bullet}$	EMI CO	, , , , , , , , , , , , , , , , , , , ,	

# EXPERIMENT ERIEF DESCRIPTION

THE NIMBUS-F LIMB RADIANCE INVERSION RADICMETER (LRIR) WILL PROVIDE CALIBRATED RADIANCE VERSUS ALTITUDE PROFILES BY INTERCEPTING RADIATION EMANATING FROM AN ATMOSPHERIC PATH WHICH IS TANGENTIAL TO A PARTICULAR GEOCENTRIC HEIGHT. THE LRIR WILL SENSE RADIATION IN FOUR SPECTRAL INTERVALS -- (1) THE 14.6- TO 15.9-MICHON CARBON DICKIDE BAND, (2) THE 14.2- TO 17.3-MICRON CARECN CIOXICE BAND. (3) THE 8.8- TO 10.1-MICRON OZCNE BAND. AND (4) THE 20- TO 25-MICRON WATER VAPOR ROTATIONAL BAND. MEASUREMENTS TAKEN IN THE TWO CARBON DIGXIDE CHANNELS AND THE WATER VAPOR CHANNEL WILL BE USED TO CALCULATE GLOBAL TEMPERATURE AND WATER VAFOR PROFILES IN THE STRATOSPHERE AND LOWER MESOSPHERE. IN ADDITION, VALUES OF THE GEOSTROPHIC WIND UP TO 1 MB (APPROXIMATELY 46 KM) WILL BE DERIVED ANALYTICALLY FROM THE DECUCED TEMPERATURE PROFILES. THE RADIOMETER WILL INCLUDE AN OFFICAL SYSTEM. A SCANNING MIRROF, CHOPPERS, AND ASSOCIATED ELECTRONICS, AND WILL EMPLOY AN AMMONIA-METHANE COOLER SYSTEM FOR THREE OF THE FOUR DETECTOR CHANNELS. THE DECUCED TEMPERATURE PROFILES WILL HAVE AN RMS ACCURACY OF FLUS OR MINUS 3 DEG AT HEIGHTS ABOVE 15 KM, WHILE THE VALLES FOR CZCNE WILL BE ACCURATE TO WITHIN PLUS OR MINUS 20 PERCENT AT 1 MB. WATER VAPOR VALUES AT THE SAME HEIGHT SHOULD BE WITHIN SO FERCENT.

ON 02/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EARTH RADIATION BUDGET (ERB)

NSSDC IC NIMBS-F-05

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR,	OI=OTHER INVESTIGATOR)
PI - W.L.	SMITH	NOAA-NESS	SLITLANE, MD
DI - A.J.	DRUMMENE	EPPLEY LABS INC	NEWPORT. RI
DI - 1.	RUFF	NO AA-NESS	SUITLAND: MD
DI - J.R.	HICKEY	EPPLEY LABS INC	NEWPORT. RI
DI - W.J.	SCHOLES	EPPLEY LABS INC	NEWPORT, RI
01 - D.T.	HILLEARY	NCAA-NESS	SUITLAND, MD

# EXPERIMENT ERIEF DESCRIPTION

THE NIMBUS-F EARTH RACIATION BUDGET (ERB) EXFERIMENT WILL (1) MEASURE REFLECTED AND EMITTED TERRESTRIAL RADIATION FLUXES IN CONJUNCTION WITH SOLAR RADIATION FOR DETERMINATION OF THE EARTH RADIATION ELOGET. (2) DETERMINE THE ANGULAR DISTRIBLTION OF TERRESTRIAL RADIATION FOR VARIOUS METECROLOGICAL AND GEOGRAPHIC REGIMES, AND (3) CORRELATE MEASUREMENTS MADE USING ICENTICAL BUT INDEPENDENT CHANNELS CALIBRATED TO THE SAME STANDARD. INCOMING SCLAR RADIATION FROM 0.2 TO 50 MICRONS WILL NERNALLY BE MCNITCRED IN 10 SPECTRAL INTERVALS SEVERAL TIMES EACH DAY AND EVERY GRBIT DUFING PERIODS OF SOLAR ACTIVITY. TERRESTRIAL RADIATION MEASUREMENTS WILL BE TAKEN CONTINUOUSLY IN 12 SPECTRAL INTERVALS ALSO FROM 0.2 TO EO MICRONS. THE MEASUREMENTS WILL BE TAKEN IN TWO WAYS. FOUR CHANNELS USING WIDE-ANGLE CFTICS (133.3-CEG FIELD OF VIEW) WILL MEASURE THE TOTAL CUTGOING RADIATION INTEGRATED OVER THE ENTIRE EARTH DISC. THE SECOND SET OF MEASUREMENTS WILL COVER EIGHT SPECTFAL

INTERVALS AND WILL EMPLOY HIGH-RESOLUTION SCANNING TECHNIQUES TO MEASURE THE TERRESTRIAL RACIATION EMANATING FROM RELATIVELY SMALL AREAS OVER A RANGE OF VARIOUS ZENITH AND AZIMUTH ANGLES. THE INSTRUMENT WILL CONSIST OF TWO IDENTICAL SCANNING MULTICHANNEL RADIOMETER HEADS. ONE WILL SCAN FORWARD OF THE SPACECRAFT. AND THE OTHER WILL SCAN AFT. BOTH HEADS WILL VIEW OPPOSITE HORIZONS AT THE SAME TIME AND WILL SCAN DOWN TO NACIF TOGETHER. THE SCAN SWEEP AND RETURN WILL DOCUR IN 64 SEC. EACH HEAD WILL CONTAIN FOUR SHORTWAVE CHANNELS (0.2 TO 4.0 MICRONS) AND FOUR LONGWAVE CHANNELS (4.0 TO SO MICRONS) WITH 0.25- BY 5.14-DEG FIELDS OF VIEW. THE CHANNELS WILL BE ORIENTED IN A DIRECTIONAL FAN TO COVER 20 DEG TO EACH SIDE OF THE ORBITAL PLANE. THE 64-SEC SCAN PERIOD WILL ALLOW AN AREA TO BE MEASURED FROM AS MANY AS 17 DIFFERENT ANGLES AS THE SPACECRAFT PASSES OVERHEAD.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PRESSURE-MODULATED RADIOMETER (FMR)

NSSEC ID NIMBS-F-09

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	DI=CTHER INVESTIGATOR)
PI - J.T. HOUGHTON	OXFORD U	CXFORD, ENGLAND
OI - C.C. RODGERS	CXFORD L	CXFCRD. ENGLAND
OI - E.J. WILLIAMSO	N GXFORD U	CXFCRD. ENGLAND
OI - G.D. PESKETT	OXFORD U	OXFORD, ENGLAND
OI - P. CURTIS	CXFDRD U	CXFCRD. ENGLAND

#### EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F PRESSURE MODULATED RADICMETER (PMR) EXFERIMENT WILL TAKE RADIOMETRIC MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND AT ALTITUDES BETWEEN 45 AND 70 KM ON A GLOBAL SCALE. BY APPROPRIATE MATHEMATICAL RETRIEVAL METHOCS. THE TEMPERATURE STRUCTURE OF THE UPPER STRATCSFHERE AND LOWER MESOSPHERE WILL THEN BE DEDUCED. THE PRESSURE MODULATION TECHNIQUE WILL PERMIT THE EXTENSION OF SELECTIVE CHOPPING TECHNIQUES TO HIGHER ALTITUDES WHERE THE PRESSURE-BROADENED EMISSION LINES IN THE 15-MICRON CARBON DIDXIDE EAND BECCME SO NARROW THAT CONVENTIONAL SPECTROMETERS AND INTERFEROMETERS FAVE INSUFFICIENT SPECTFAL RESCLUTION. IN ADDITION TO PRESSURE SCANNING (IN DISCRETE STEPS). THE RADICNETER WILL ALSO EMPLOY DOPPLER SCANNING ALONG THE DIRECTION OF FLIGHT. THE PMR WILL COMPRISE TWO SIMILAR RADIOMETER CHANNELS, EACH CONSISTING OF A PLANE SCANNING MIRROR. REFERENCE BLACKBODY, PRESSURE MODULATOR CELL, AND DETECTOR ASSEMBLY. THE PLANE MIRROR WILL BE GOLD-CCATED AND MOUNTED AT 45 DEG ON A 90-DEG STEPPING MOTOR SO THAT THE FIELD OF VIEW OF THE CHANNEL MAY BE DIRECTED TO SPACE OF TO THE INTERNAL REFERENCE BLACKBODY FOR INFLIGHT FANGE AND ZERO CALIBRATION. THE MOTOR WILL BE MOUNTED ON A PAIR OF FLEXIBLE PIVOTS SO THAT THE MIRROR CAN BE ROTATED THROUGH PLUS OR MINUS 7-1/2 DEG FROM ITS REST POSITION TO GIVE THE REQUIRED DOPPLER SCAN. MAJOR COMPONENTS IN THE PRESSURE MODULATOR CELL WILL BE A MOVABLE PISTON, DIAPHRAGE, AND MAGNETIC DRIVE CCIL. THE DETECTOR ASSEMBLY WILL CONSIST OF A FIELD LENS. A CONDENSING LIGHT PIPE. AND A PYROELECTRIC FLAKE BOLOMETER. EACH RADIOMETER WILL HAVE A FIELD OF VIEW THAT IS 20 DEG WHOLE ANGLE ACROSS THE SPACECRAFT'S LINE OF FLIGHT AND 40 DEG WHOLE ANGLE PARALLEL TO THE LINE OF FLIGHT. THE DEDUCED TEMPERATURE VALUES SHOULD BE WITHIN PLUS OR MINUS 2 DEG K AT 65 KM AND ABOUT PLUS OR MINUS 0.2 DEG K NEAR 50 KM.

ON 02/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCANNING MICROWAVE SPECTROMETER (SCAMS) NSSDC ID NIMBS-F-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTHER INVESTIGATOR) CAMERICGE. NA MIT PE - D.H. STAFI IN PASADENA. CA DI - F.T. BARATH NASA-JPL CAMERICGE. MA # T T M PARRETT 01 - A.H. HCUSTON. TX OI - W.B. NA SA - JSC LENGIR CAMBRIDGE. MA MIT OI - W. PHILLIPS

# EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F SCANNING MICROWAVE SPECTROMETER (SCAMS) IS DESIGNED TO MAP TROPOSPHERIC TEMPERATURE PROFILES. WATER VAPOR ABUNDANCE, AND CLOUD WATER CONTENT, AND TO DETAIN SUCH DATA FOR WEATHER PREDICTION PURPOSES EVEN IN THE PRESENCE OF CLOUGS. WHICH BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS. THE SCANS WILL CONTINUOUSLY MONITOR EMITTED THERNAL RADIATION AT WAVELENGTHS OF 13.5, 9.5, 5.7, 4.5. AND 4.6 MM. THE THREE CHANNELS NEAR THE 5.0-MM OXYGEN AESORFTION BAND WILL BE USED PRIMARILY TO DEDUCE ATMOSPHERIC TEMPERATURE PROFILES. THE TWO CHANNELS NEAR 10 MM WILL PERMIT WATER VAPOR AND CLOUD WATER CONTENT OVER CALM OCEANS TO BE ESTIMATED SEPARATELY. THE INSTRUMENT, A DICKE-SUPERHETERODYNE TYPE, WILL SCAN PLUS OR MINUS 45 DEG NURMAL TO THE DREITAL PLANE WITH A 10-DEG FIELD OF VIEW. THE THREE DXYGEN CHANNELS WILL SHARE COMMON SIGNAL AND REFERENCE ANTENNAS. BOTH WATER VAPOR CHANNELS WILL HAVE THEIR OWN SIGNALS AND REFERENCE ANTENNAS. THE ABSOLUTE RMS ACCURACY OF THE CXYGEN CHANNELS WILL BE BETTER THAN 2 DEG K AND THAT OF THE WATER VAPOR CHANNELS BETTER THAN 1 DEG K. THE DYNAMIC RANGE FOR ALL CHANNELS WILL BE FROM C TO 400 DEG K.

ON 02/00/68. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TEMFERATURE/HUMIDITY INFRARED RADIOMETER NSSDC ID NIMBS-F-12 (TER)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CT+ER INVESTIGATOR)
PI - w.R. EANDEEN NASA-GSFC GREENEELT, MD

#### EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F TEMPERATURE-FUMIDITY INFRARED RADICMETER (THIR) WILL DETECT EMITTED THERMAL RADIATION IN BOTH THE 10.5- TO 12.5-MICRON REGION (IR WINDUW) AND THE 6.5- TO 7.0-MICRON REGION (WATER VAFOR). THE WINDOW CHANNEL WILL MEASURE CLOUDTOP TEMPERATURES AND WILL BE CAFABLE OF PRODUCING HIGH-RESOLUTION PICTURES OF CLOUDCOVER AND THERMAL GRADIENTS ON LAND AND WATER SURFACES IN CLUUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PORTIONS OF THE DREIT. THE OTHER CHANNEL WILL OPERATE PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSORY DATA FROM THESE TWO CHANNELS WILL PRIMARILY BE USED TO SUPPORT OTHER, MORE SOPHISTICATED, METEOROLOGICAL EXPERIMENTS ON BOARD NIMBUS-F. THE INSTRUMENT WILL CONSIST OF A 12.7-CM CASSEGRAIN SYSTEM AND SCANNING MIRROR COMMON TO BUTH CHANNELS, A SEAM SPLITTER, FILTERS, AND TWO GERMANIUM-INVERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV. NO IMAGE IS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WILL SE COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT AS DEG TO THE OPTICAL AXIS. THE MIFROR WILL RUTATE THROUGH 360 DEG AT 48 RPM AND WILL SCAN IN A PLANE NORMAL TO THE SPACECRAFT VELGCITY. THE ENERGY WILL THEN BE FOCUSED ON A DICHROMATIC BEAM SPLITTER WHICH WILL DIVICE THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THE THIS SENSOR WILL TRANSFORM THE RECEIVED RADIATION INTO ELECTRIC DUTPUT (VOLTAGES), WHICH WILL BE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - TRACKING AND DATA RELAY

EL-4-Samin DI DOSSA

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTFER INVESTIGATOR) PI - F.O. VONEUN NASA-GSFC GREENBELT, MD 01 - C.E. COTE NASA-GSEC GREENBELT, MD 01 - W.J. MILLER FORDHAM U NEW YORK. NY 01 - T.R. BUCKLER NASA- GSFC GREENBELT, ND

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE THE NIMBUS PORTION OF A COMMUNICATION LINK FROM NIMEUS TO ATS TO A GROUND STATICN. THE FURFCSE OF THE EXPERIMENT WILL BE TO GAIN INFORMATION ON THE USE OF SUCH A LINK FOR RANGE AND RATE COMMUNICATIONS (FOR SATELLITE GEODETIC FURFOSES) AND FOR DATA COMMUNICATION FROM A LOW-ORBITING SPACECRAFT THROUGH A SYNCHRONOUS SPACECRAFT TO A GROUND TELEMETRY STATION. THE INSTRUMENTATION WILL INCLUDE AN S-BAND TRANSPONDER. A COMMAND DETECTOR/DECODER. AN ANTENNA PREGRAMMER. A DIGITAL EVALUATION MODULE, AN S-EARC ARTERNA, AND AN ARTERNA GIRBAL ASSEMBLY.

ON 02/00/68, THE SPACECRAFT MISSICN WAS APPREVED.

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SPACECRAFT COMMON NAME- DSO-1 ALTERNATE NAMES - OSO-EYE, PL-7310

NEEDC ID OSO-I

PLANNED LAUNCH DATE- 03/00/75

SPACECRAFT WEIGHT IN ORBIT- 4280. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE- DELTA

INCLINATION-

FUNDING AGENCY UNITED STATES NASA-DSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- 96. MIN

APDAPSIS- 550.000 KM ALT FERIAPSIS- 550.000 KM ALT

SPACECRAFT PERSUNNEL (PM=PRÉJECT MANAGER, FS=PROJECT SCIENTIST)

PM - J.M. THULE

NASA-GSEC

GREENEELT. M.C.

PS - S.P. MARAN NASA- GSEC

GREENBELT, ND

#### SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVES OF THE OSO SATELLITE SERIES WILL BE TO PERFORM SOLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SCLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT. X-RAY AND GAMMA FACIATION. THE GSC I PLATFORM WILL CONSIST OF A "SAIL" SECTION, WHICH WILL POINT TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN. AND A " WHEEL" SECTION. WHICH WILL SPIN ABOUT AN AXIS PERFENDICULAR TO THE POINT ING DIRECTION OF THE SAIL AND WILL CARRY FIVE EXPERIMENTS. ATTITUDE ACJUSTMENT WILL BE PERFORMED BY CAS JETS AND A MAGNETIC TORGUING COIL. FOINTING CONTROL WILL PERMIT THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN

A 40- X 40-APC-MIN TO 60- X 60-ARC-MIN FASTER PATTERN. IN ADDITION. THE POINTED SECTION MAY BE COMMANDED TO SELECT AND SCAN A 1- X 1-ARC-MIN OR 5- X 5-ARC-MIN REGION ANYWHERE ON THE SOLAR DISK. DATA WILL BE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY POMPH TELEMETRY. A COMMAND SYSTEM WILL PROVIDE FOR AT LEAST 512 GROUND-BASED CONNANCS.

ON 01/00/72. THE SPACECRAFT MISSICH WAS APPREVED.

EXPERIMENT NAME- FIGH-RESULUTION ULTRAVIOLET SPECTROMETER NSSDC 10 050-1 -01 MEASUREMENTS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CT+ER INVESTIGATOR) BOULDER. CO U OF COLUTRADE PI - E.C. BRUNER. JR. UN KNO WN LNKNEWN ATHAY 01 - G.

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE SCLAR ULTRAVIOLET LINE SHAPES (FROM 1050 A TO 2200 A IN WAVELENGTH) AND THEIR VARIATION WITH TIME AND POSITION ON THE DISK. THE INSTRUMENT WILL BE AN EBERT-TYPE HIGH-RESOLUTION SPECTROMETER MOUNTED IN THE OSC SAIL. AND WILL HAVE ENCUGH SELF-CONTAINED LEGIC TO OPERATE IN SEVERAL DIFFERENT MEDES BY GREEND COMMAND.

UN 01/00/72. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- CHRCMOSPHERE FINE STRUCTURE STUDY ASSOC ID CSC-1 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. GI=CTFER INVESTIGATOR) PARIS, FRANCE U OF PARIS LEMAIRE PI - P. EUR SPACE TECH CENTER PARIS, FRANCE V IDAL-MACJAF .A - 10 HUNTINGTEN. WV MARSHALL U CI - R.M. BUNNETT

VERRIERES-LE-BUISSON, FRANCE CNRS 01 - J.C. VIAL.

# EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE SOLAR CHROMOSPHERIC SPATIAL AND WAVELENGTH STRUCTURE FOR THE FOLLOWING SPECTRAL LINES IN THE 1900-A TO 4000-A REGION -- LYMAN-ALPHA, LYMAN-BETA, THE H AND K LINES OF MAGNESIUM II. AND THE H AND K LINES OF CALCIUM II. THE INSTRUMENT, WHICH WILL BE COMPOSED OF A CASSEGRAIN TELESCOPE AND A GRATING SPECTRONETER. CAN OPERATE IN TWO MOUES - (1) IT CAN HOLD A FIXED SOLAR LOCATION AND SCAN THE SPECTRAL LINES. (2) IT CAN SIMULTANEOUSLY FIX ON THREE OF THE SIX SEECTRAL LINES AND SCAN A 1-ARC-MIN X 1-ARC-MIN REGION OF THE SOLAR DISK.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

NSSDC ID ESC-I -03 EXPERIMENT NAME - FIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X HAYS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) COLUMBIA L NEW YCRK. NY P1 - R. NOVICK NEW YORK, NY COLUMBIA U DI - J.R.P. ANGEL VE# ACEK\* VA VANCENEGUT J AIBANJOS OI - P.A. CCLUMBIA L NEW YERK. NY OI - Me ₩ E ISSKOFF COLUMBIA U NEW YORK, NY 01 - R.S. WOLFF

#### EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MONITOR CONTINUOUSLY THE SUN'S EMISSION IN THE 2- TO E-KEV RANGE, AND TO CHEATAIN A COMPLETE SPECTRUM IN THAT RANGE EVERY 12 SEC DURING FLARES. THE EXPERIMENT IS ALSO DESIGNED TO DETAIN HIGH-RESOLUTION SPECTRA OF MANY CELESTIAL X-RAY SOURCES. THE INSTRUMENT WILL BE A SLITLESS ERAGE SPECTROMETER MOUNTED ON THE USC WHEEL SECTION, WHICH WILL UTILIZE THE WHEEL ROTATION TO PROVIDE SPECTRAL SCANNING. THREE PROPERTIONAL COUNTERS WILL BE COLLIMATED TO OPTIMIZE DETECTION AT 2 KEV. 2.6 KEV. AND 7.2 KEV. RESPECTIVELY. THE GRAPHITE CRYSTAL WILL HAVE A 1000-CM-SG AREA.

ON 01/00/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAPPING X-RAY HELICMETER

NSSCC IC CSC-I -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 01=0THER INVESTIGATOR)

PI - J.L. CULTANE LOCKHEED PALO ALTO, CA
GI + L.W. ACTLN LCCKHEED PALC ALTO, CA

DI - P.C. CATURA UNKNOWN LNKNOWN

#### EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE THE LOCATION. SPECTRUM. AND INTENSITY OF INTERMEDIATE ENERGY X-RAYS (2- TO 30-KeV) FROM INDIVIDUAL SOLAR ACTIVE REGIONS AND FROM EXTRA-SOLAR X-RAY SOURCES. THE INSTRUMENT WILL CONSIST OF THREE INDEPENDENT X-RAY DETECTION SYSTEMS. EACH COMPOSED OF TWO GAS-FILLED PROPORTIONAL COUNTERS WHICH WILL VIEW SFACE THROUGH A MULTIPLE FAN-BEAM COLLIMATOR. THE FIELD OF VIEW WILL BE Z ARC-MIN (FULL-WICTH HALF-MAXIMUM). AND EACH PRIMARY DETECTOR WILL HAVE AN EFFECTIVE AREA OF 100 CM SG.

ON 01/00/72, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME - SOFT X-RAY BACKGROUNG RADIATION NSSOC ID CSC-I -05 INVESTIGATION

EXPERIMENT PERSONNEL (FI#PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI + W+L+ KRAUSHAAR U OF WISCONSIN MACISON, WI

PI - W.L. KRAUSHAAR U OF WISCENSIN MACISON, WI OI - A. BUNNER U OF WISCENSIN MACISON, WI

#### EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE GALACTIC LATITUDE DEPENDENCE OF THE X-RAY BACKGROUND RADIATION IN THE C.15C- TO 45-KEV REGION. EMPHASIZING THE SOFT X-RAY FORTION. TWO SETS OF THREE PROPORTICINAL COUNTERS MOUNTED ON THE OSO WHEEL WILL VIEW PARALLEL AND ANTIPARALLEL TO THE WHEEL SPIN DIRECTION THROUGH A 4- BY 4-DEG (FULL-WIDTH HALF-MAXIMUM) COLLIMATOR. SENSITIVITY IS EXPECTED TO BE ABOUT 1 PEPCENT STATISTICAL ACCURACY NEAR THE GALACTIC POLES. AND ENERGY RESOLUTION WILL BE PROVIDED BY SELECTED FILTERS.

CN 01/00/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COSMIC X-RAY SPECTROSCOPY

NSSCC IC CSC-I -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHEF INVESTIGATOR)
PI - E · A · BOLDT NASA-GSFC GREENBELT · MD
CI - S · S · HOLT NASA-GSFC GREENBELT · MC
OI + P · J · SERLEMITSOS NASA-GSFC GREENBELT · MD

### EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO OBTAIN THE SPECTRA OF X-RAY SOURCES AND THE DIFFUSE BACKGROUND IN THE ENERGY RANGE OF 2- TC 40-KEV, USING TWO PROPORTIONAL COUNTERS, ONE FILLED WITH ARGON. THE CTHER WITH XENCH TO PRESSURES GREATER THAN 1 ATMOSPHERE. THE ARGON DETECTOR WILL EMPHASIZE ENERGIES BELOW 10 KEV. MECHANICALLY COLLIMATED TO A FIELD OF VIEW OF 1 DEG BY 5 DEG. THE XENON DETECTOR WILL EMPHASIZE ENERGIES ABOVE 10 KEV AND WILL HAVE A FIELD OF VIEW OF 1 DEG BY 20 DEG. THE DETECTORS WILL BE MOUNTED ON THE WHEEL SECTION. SD THAT THEY WILL BOTH BE OFFSET FROM THE SPIN AXIS BY ABOUT 5 DEG.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FIGH-ENERGY CELESTIAL X RAYS

RESDO ID CSC-I -07

EXPERIMENT PERS "NNEL (PI=PRINCIPAL INVESTIGATOR) CI=CTHEF INVESTIGATOR)
PI - K.J. FRUST NASA-GSFC GREENBELT. MD

DI - C.S. WELLER. JR. NAVAL RESEARCH LAB WASHINGTON. DC

## EXPERIMENT BRIEF CESCRIFTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO MEASURE THE ENERGY SPECTRA OF ALL KNOWN X-RAY SOURCES ABOVE THE INTENSITY THRESHOLD OF 10 TO THE MINUS 6 PHOTONS/CM-SC-SEC-KEV IN THE ENERGY REGION .01 TO 1 MEV. THE INSTRUMENT WILL CONSIST OF 67-CM-SQ CSI (SODIUM) SCINTILLATION CRYSTALS SURROUNCED BY A HONEYCOMB-TYPE CSI (SODIUM) ANTICOINCIDENCE COLLIMATOR. WHICH WILL PROVIDE AN ACCEPTANCE ANGLE OF 6.30 DEG FROM THE VIEWING AXIS. THE INSTRUMENT WILL BE MOUNTED ON THE DSD WHEEL SECTION NEARLY PARALLEL TO THE SATELLITE SPIN AXIS.

ON 01/00/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FUV FROM EARTH AND SPACE

NSSCC IC CSC-I -08

EXPERIMENT PERSONNEL (PI≃PRINCIPAL INVESTIGATOR, DI∓CTHER INVESTIGATOR) PI - CoS. WELLER, JR. NAVAL RESEARCH LAB WASHINGTON, DC

#### EXPERIMENT ERLEF DESCRIPTION

THIS EXPERIMENT, MOUNTED IN THE WHEEL SECTION, WILL OBTAIN SPATIAL AND TEMPORAL MEASUREMENTS OF EXTREME ULTRAVICLET (EUV) EMISSIONS OF HYDROGEN, HELIUM, AND DXYCEN IN THE EARTH'S ATMOSPHERE AND IN INTERPLANETARY AND GALACTIC SPACE, THE INSTRUMENTATION WILL CONSIST OF TWO PHOTOMETERS DESIGNED TO MEASURE EUV RESUMANCE RADIATION IN VARIOUS WAVELENGTHS FROM 150 TO 1070 A AND IN PORTIONS OF THE 1125- TO 1230-A BAND, EACH PHOTOMETER WILL CONSIST OF A CONTINUOUS CHANNEL ELECTRON MULTIPLIER USED AS A PHOTON DETECTOR, TOGETHER WITH A THIN METAL FILM OR A MAGNESIUM FLUCRIDE-CXYCEN CELL TO SERVE AS OPTICAL EANDPASS FILTERS, THERE ARE FOUR EUCH BANDPASS FILTERS --- (1) A THIN FILM OF 1000-A-THICK AL AND 500-A-THICK CARBON (BANDWIDTH OF 150 TO 350 A).

(2) A THIN FILM CF 1000-A-THICK AL (BANDWIDTH OF 150 TO 800 A). (3) A THIN FILM OF 1500-A-THICK INDIUM (BANDWIDTH OF 740 TO 1070 A). AND (4) A CELL WITH MAGNESIUM FLUCRIDE WINDOWS FILLED WITH ONE ATMOSPHERE OF CXYGEN (BANDWIDTH CONSISTING OF PORTIONS OF 1125 TO 1230 A). THESE BANDPASS FILTERS WILL BE MOUNTED ON A WHEEL IN FRONT OF THE PHOTOMULTIPLIERS. WHICH WILL BE ROTATED AT REGULAR INTERVALS TO CHANGE THE FILTERS. THIS WILL MAKE TWO OF THE INCICATED WAVELENGTH RANGES OPERATIONAL AT ANY GIVEN TIME. THE INSTRUMENT WILL BE MOUNTED WITH THE PHOTOMETER AXES AT A SMALL ANGLE WITH RESPECT TO THE SATELLITE-SUR LINE AND WITH SUFFICIENT BAFFLING THAT THE PHOTOMETERS WILL NEVER "SEE" THE SUN.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- PIONEER VENUS ORBITER ALTERNATE NAMES-PIONEER VENUS 1978 CREIT

NSSCC ID PIC78CR

PLANNED LAUNCH CATE- 08/00/78 SPACECRAFT WEIGHT IN CREIT-

ĸG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE-

FUNDING AGENCY UNITED STATES

NASA-OSS

PLANNED ORBIT PARAMETERS

DRBIT TYPE- VENUSCENTRIC APOAPS IS -ĶM ALT

ORBIT PERICC-PERIAPSIS-

MIN KM ALT INCLINATION-

DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

# SPACECRAFT BRIEF DESCRIFTION

THIS PICNEER CLASS SPACECRAFT IS TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME AS THE FIGNEER VENUS PROBE SPACECRAFT REACHES THE VENUSIAN ATMOSPHERE. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS! ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET. THE NATURE AND COMPOSITION OF THE CLBUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE PIONEER VENUS PROBE SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC FROBES TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ACCITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UF.

ON 06/14/73, THE SPACECRAFT MISSION WAS PROPOSED.

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SPACECRAFT COMMON NAME- PIGNEER VENUS PROBE A NESDC ID FIC78PA ALTERNATE NAMES-PIONEER VENUS 1978, PIONEER VENUS FROBE BUS

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN CREIT-380. KG

LAUNCH VEHICLE-

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

FUNDING AGENCY UNITED STATES

NASA-BSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)

MOFFET FIELD . CA NASA-ARC NUNAMAKER PM - Raka MOFFET FIELD, CA NASA-ARC CCLIN PS - L.

# SPACECHAFT ERIEF DESCRIFTION

THIS PIDNEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF. TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT EURNS UP. AN INSTRUMENT-LACEN SISTER SHIP. FICKEEF VENUS ORBITER. IS SCHEDULED TO GO INTO DRBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER CETAILED INFURMATION ON VENUS ATMOSPHERE AND CLCLDS. INCLUCING CONFESITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET. THE NATURE AND COMPOSITION OF THE CLOUDS. THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RACIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED. AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE. WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A STALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE EUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT. THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 EPS. WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 1 CC BPS.

ON 06/19/73. THE SPACECRAFT MISSIEN WAS APPROVED.

EXPERIMENT NAME- LANGMUIR PROBE

NESCO ID FIC78FA-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) ANN ARBOR . MI U DE MICHIGAN PI - A.F. NAGY SAN DIEGO. CA U OF CALIFORNIA. SC OI - PoMo BANKS GREENEELT, MD NASA-GSFC BRACE QI - LoHe PITTSBURGH . PA U OF PITTSEURGH DONAHUE OI - ToMa CAMERIDGE MA HARVARD U 01 - M. 8. MCELRCY

# EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A RETARDING FCTENTIAL (LANGMUIR) PROBE WITH A CYLINDRICAL GUARD EXTENDING FROM THE SPACECRAFT. THE COLLECTOR WILL EXTEND ALONG THE AXIS OF THE GUARD AND PROJECT CUTWARC. AS THE VOLTAGE ON THE COLLECTOR IS SWEPT THROUGH A GIVEN FANGE, A VARYING CURRENT WILL FLOW THROUGH THE COLLECTOR. FROM THIS VOLTAGE/CURRENT PROFILE. ELECTRON DENSITIES AND TEMPERATURES CAN BE DETERMINED. THE PURPOSE OF THIS EXPERIMENT WILL BE TO HELP DETERMINE CHARACTERISTICS OF THE VENUSIAN DENCEPHERE.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT PERSONNEL (PIZPRINCIPAL INVESTIGATOR)

PI - H.A.	TAYLOR, JR.	NASA-GSFC	GREENEELT, MD
OI - S.J.	EAUER	NASA-GSFC	GREENBELT, MD
01 - T.M.	DONAHUE	U CF PITTSBURGH	PITTSBURGH, PA
01 - P.A.	CLOUTIER	RICE U	HOUSTON. TX
01 - R.E.	HARTLE	NASA-GSFC	GREENEELT, MD
OI - H.C.	BRINTON	NASA-GSFC	GREENBELT, MD
01 - F.C.	MICHEL	RICE U	HOUSTON: TX

# EXPERIMENT BRIEF DESCRIPTION .

THIS ION MASS SPECTROMETER EXPERIMENT WILL OBTAIN MEASUREMENTS WHICH WILL PROVIDE INFORMATION ON THE SOLAR WIND INTERACTION WITH VENUS, UPPER ATMOSPHERE FROTECHEMISTRY, AND THE MASS AND HEAT TRANSPORT CHARACTERISTICS OF THE ATMOSPHERE. A BENNETT ION SPECTROMETER, SIMILAR TO UNITS FLOWN ON MANY EARTH SATELLITES AND ROCKETS, WILL MEASURE VENUS UPPER ATMOSPHERE ION CONCENTRATIONS IN THE MASS RANGE FROM 1 TO 60 ATOMIC MASS UNITS (AMU) FROM THE TIME OF CROSSING VENUS BOWSHOCK TO BUS BURNUP.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL PARTICLE MASS SPECTROMETER

NSSDC ID FICTSPA-03

EXPERIMENT PERSONNEL (PI $\approx$ PRINCIPAL INVESTIGATOR, DI $\approx$ OTHER INVESTIGATOR) PI = U. VON ZAHN U OF BONN BONN, W. GERMANY OI = A-O-C. NIER U OF MINNESOTA MINNEAPCLIS, MN OI = D. HUNTEN KITT PEAK NATL OBS TUCSON, AZ

# EXPERIMENT BRIEF DESCRIPTION

THIS NEUTRAL PARTICLE MASS SPECTROMETER EXPERIMENT WILL CETAIN MEASUREMENTS WHICH WILL PROVIDE INFORMATION ON THE ORIGIN AND EVOLUTION OF VENUS! ATMOSPHERE, THE PRESENT ENERGY BALANCE AND DYNAMICS OF THE UPPER ATMOSPHERE, AND THE INTERACTION OF THE UPPER ATMOSPHERE WITH SOLAR RACIATION AND THE INTERFLANETARY MEDIUM. A MAGNETIC DEFLECTION. DOUBLE-FOCUSING MASS SPECTROMETER WILL BE FLOWN TO MEASURE THE UPPER ATMOSPHERE NEUTRAL MOLECULES IN THE MASS RANGE 1 TO 46 ATOMIC MASS UNITS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER

NSSCC IC PIO78PA-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - W. KNUDSEN LOCKHEED PALC ALTC. CA

GI - K. SPENNER WKG GP SPC PHYS RES FREIBURG. GERMANY

DI - R. WHITTEN NASA-ARC MOFFETT FIELD. CA

# EXPERIMENT BRIEF CESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBSERVE DAYSIDE CHARACTERISTICS (ELECTRON AND ION, DENSITIES AND TEMPERATURES) OF THE VENUSIAN IONOSPHERE, THE INSTRUMENT WILL BE A PLANAR RETARDING POTENTIAL ANALYZER. ENTRANCE GRIDS CAN BE BIASED TO FERMIT ENTRY OF ELECTRONS OR IONS. A VOLTAGE SWEEP PROGRAMMED ON THE RETARDING GRIDS WILL ALLOW A VARYING

CURRENT TO FLOW TO THE COLLECTOR. ANALYSIS OF THIS VOLTAGE/CURRENT PROFILE WILL PRODUCE VALUES OF DENSITY AND TEMPERATURE.

ON 06/14/73. THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET SPECTROMETER

NSSDC ID PIO78PA-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) BOULDER, CC U OF COLORADO STEWART PI - A. BOULDER . CC U OF COLORADO OI - C. A. BARTH BOULDER. CO U OF COLORADO HORD 01 - C.W.

# EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN EBERT-FASTIE TYPE SPECTROMETER WITH A PROGRAMMED GRATING TO ANALYZE THE UV EMISSION OF UFFER ATMOSPHERE GASSES. THE INSTRUMENT WILL BE SIMILAR TO THE MCDELS FLOWN ON MARINERS 6. 7. AND 9. THE MEASUREMENTS WILL PROVIDE INFORMATION ON THE COMPOSITION OF THE ATMOSPHERE. THE TEMPERATURE AND ENERGY BALANCE OF THE THERMOSPHERE, THE REASON FOR THE STABILITY OF CARBON DICKIDE. AND THE ESCAPE OF HYDROGEN FROM VENUS. THE INSTRUMENT WILL OPERATE IN THE 1100 TO 3400 A REGION. THE INSTRUMENT WILL WEIGH ABOUT 3 KG AND WILL USE ABOUT 1.5 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING

NSSDC ID FIC78FA-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, 01=CTHER INVESTIGATOR) CAMBRIDGE . MA MIT PETT ENGILL PI - G. CANERICGE. MA ·I - 10 SHAPIRC MIT CAMBRIDGE . NA MIT 01 - R. FRINN CAMBRIDGE. MA MIT CHARNEY GI - J.

# EXPERIMENT ERIEF CESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN CROER TO INFER OF PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MCDELLING THE CIRCULATION PATTERNS OF VENUS! ATMOSPHERE. DATA TAKEN FRIOR TO PROBE ENTRY WILL BE USED. IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS. GRAVITY FIELD FOR USE WITH PROCE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- PIONEER VENUS PROBE B NSSDC ID PI078PB PICHEER VENUS 1978, FICHEER VENUS LAFG PROBE ALTERNATE NAMES-

PLANNED LAUNCH DATE- 05/00/78

SPACECRAFT WEIGHT IN CREIT-

27. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE-

FUNDING AGENCY UNITED STATES

NASA-CSS

SPACECRAFT PERSONNEL (PM=PRCJECT MANAGER, FS=PRCJECT SCIENTIST)

PM - R.R. NUNAMAKER NASA-ARC MOFFET FIELD. CA PS - L. COLIN NASA-ARC MOFFET FIELD. CA

SPACECRAFT BRIEF DESCRIPTION

THIS PIGNEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LAFGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT EURNS UP. AN INSTRUMENT-LACEN SISTER SHIF. FICKEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY DEJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS! ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED. AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE. WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE EUS IS DESTROYED BY THE HEAT OF AIMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 EPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 EFS.

ON 06/14/73, THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSOC ID PIO78P8-01

EXPERIMENT FERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - A. . SFIFE NASA-ARC MOFFETT FIELD, CA CI - S . . SOMMER NASA-ARC NCFFETT FIELD. CA 01 - K. BLANCHARD NA SAHLA FC - LANGLEY FIELD. VA OI - D.A. KIRK NASA-ARC MOFFETT FIELD. CA

#### EXPERIMENT ERIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A THREE-AXIS ACCELEROMETER, PRESSURE SENSORS, AND TEMPERATURE SENSORS, THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED BY THE PART VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R7106-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR THE LARGE PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THEY WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TURBULENCE. BY COMPARING ATMOSPHERE CONDITIONS ALONG THE LARGE FROM TRAJECTORY WITH THOSE MEASURED BY THE SMALL PROBES. CIRCULATION MODELS OF THE ATMOSPHERE WILL BE DETERMINED. THE INSTRUMENTS WILL WEIGH ABOUT 2.5 KG AND WILL CONSUME ABOUT 7 W OF POWER.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPREVED.

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSSDC ID PIG78PB-02

EXPERIMENT PERSONNEL (FIEPRINCIPAL INVESTIGATOR. CI=(THER INVESTIGATOR) PARIS, FRANCE U OF PARIS PI - J.t. BLAMONT MOFFETT FIELD, CA NASA-ARC 01 - B. RAGENT

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DICOE TO ILLUMINATE THE CLOUDS. THE ALTITUDE HISTORY OF THE BACKS CATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALING THE TRAJECTORIES. COMPARISONS WITH THE MEASUREMENTS FROM THE SMALL PROBES WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER WILL OPERATE AT ABOUT 9000 A. THE EXPERIMENT WILL WEIGH ABOUT 0.5 KG AND USE ABOUT 1.2 % OF POWER.

ON 06/14/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- CLOUD PARTICLE SIZE SPECTROMETER NSSDC ID P1078PB+03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) U DE CHICAGE CHICAGO. IL

KNOLLENEERG PI - R. TUCSON . AZ KITT PEAK NATE USS 01 - D. HUNT EN

# EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO MEASURE VENUS. CLOUD PARTICLE SIZES AND CONCENTRATIONS. A LASER WILL BE USED TO ILLUMINATE CLOUD PARTICLES. UPTICAL LENSES WILL IMAGE THE PARTICLE SHADOWS ON ARRAYS OF DETECTURS. THE PARTICLE SHADOWS WILL BE USED TO DETERMINE FARTICLE SIZE AND CONCENTRATION. THE FLIGHT SENSOR WILL BE SIMILAR TO THOSE FLOWN IN AIRCRAFT AND BALLOONS .

ON 06/14/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GAS CHRUMATEGRAPH

NSSCC IC FIC78PE-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)

MOFFETT FIELD, CA NASA-ARC •I•V - 19 OYAMA NOFFETT FIELD, CA 01 - J. NASA-ARC POLLACK MOFFETT FIELD . CA NASA-ARC 01 - G. CARLE MOFFETT FIELD. CA NASA-ARC OI - F. WOELLER

### EXPERIMENT ERIEF DESCRIPTION

THE DEJECTIVE OF THIS EXPERIMENT WILL BE TO DETERMINE THE COMPOSITION OF VENUS! LOWER ATMOSPHERE. FROM THESE MEASUREMENTS, DEDUCTIONS WILL BE MADE OF THE GASEOUS SOURCES OF INFPARED OPACITY. THE DEGREE OF DIFFERENTIATION OF VENUS' INTERIOR, THE DEGREE OF SIMILARITY BETWEEN THE SOLID BODIES OF EARTH AND VENUS. AND EVOLUTION OF VENUS! ATMOSPHERE. TWO GAS CHROMATOGRAPH COLUMNS WILL BE USED TO ANALYZE SAMPLES OF THE ATMOSPHERE DURING PROBE DESCENT.

THREE OR FOUR SAMPLES WILL EE ANALYZED.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFRARED RADIOMETER

NSSCC IC PIO78PB-05

EXPERIMENT	PERS ONNEL	(PI=PRINCIPAL INVESTIGATOR.	DI=OTHER INVESTIGATOR)
PI - V.E.	SUUMI	U OF WISCONSIN	WADISCN. WI
0I - A.	FYMAT	NASA-JPĽ	PASADENA, CA
GI - J.	LENDELE	U OF LILLE	LILLE, FRANCE
61 - L.A.	SROMOVSKY	U OF WISCONSIN	MACISON. WI
OI - G.	DANIELSON	U OF WISCONSIN	MADISON. WI
01 - M.	HERMAN	U OF LILLE	LILLE, FRANCE

#### EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL USE A SMALL NET-FLUX PACICMETER TO MEASURE THE UPWARD AND DOWNWARD RADIATION FLUXES BETWEEN 0.2 AND 30 MICRONS BURING THE PROBE'S DESCENT TO THE SURFACE. THE OBJECTIVES WILL BE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SCLAR ENERGY IS ABSTREED BY THE ATMOSPHERE. THE INSTRUMENT WILL WEIGH ABOUT 395 GRANS AND USE 1.3 W OF FOWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL PARTICLE WASS SPECTAGNETER

NSSCC IC P1078P8-06

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	OI=CTHER INVESTIGATOR)
PI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
01 - J.c.	AINSWORTH	NA SA – G SF C	GREENBELT. MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR. MI
01 - D.	HUNTEN	KITT PEAK NATE CE	S TECSEN. AZ
0I - J.	LEWIS	MIT	BCSTCN. NA
<b>Çi -</b> H•ë•	NIEMANN	NASA-GSFC	GREENBELT, MD

## EXPERIMENT ERIEF DESCRIPTION

THE DEJECTIVE OF THIS INVESTIGATION WILL BE TO MEASURE THE COMPOSITION OF THE LOWER ATMOSPHERE OF VENUS. A MULTIPLE SAMPLE GAS INLET AND A GUADRUFGLE MASS SPECTROMETER WILL BE USED. ABOUT 10 SAMPLES OF VENUS. ATMOSPHERE WILL BE ANALYZED DURING THE FROSE DESCENT. THE ANALYZER. SIMILAR IN DESIGN TO THOSE FLOWN IN OGO AND AEROS SATELLITES, WILL HAVE A MASS RANGE FROM 1 TO 256 ATOMIC MASS UNITS (AMU) AND A DYNAMIC RANGE GREATER THAN 10 TO THE FIFTH POWER.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT. NAME - SOLAR ENERGY PENETRATION INTO THE ATMOSPHERE

NEEDC ID FIG78P8-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - M. TOMASKÇ U OF ARIZONA TUCSON, AZ
OI - W. WOLFE U OF ARIZONA TUCSON, AZ
OI - A. CLEMENTS U OF ARIZONA TUCSON, AZ

# EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION WILL BE TO DETERMINE THE REGIONS IN VENUS\* ATMOSPHERE WHERE SOLAR ENERGY IS DEPOSITED. SIX NARROW-FIELD-OF-VIEW DETECTORS WILL BE USED TO MEASURE THE INTENSITY OF SCATTERED SOLAR LIGHT. AS THE PROBE DESCENDS THROUGH THE ATMOSPHERE. THE DIFFERENCE BETWEEN UPWARD-LOOKING AND DOWNWARD-LOOKING DETECTORS WILL INDICATE THE NET DOWNWARD FLUX.

ON 06/14/73, THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- SPIN-SCAN PROTOMETER

NESCC ID F1C78P8-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - J. WEINMAN U OF WISCONSIN MADISON, WI
DI - R.S. PARENT L OF WISCONSIN MADISON, WI

EXPERIMENT BRIEF DESCRIPTION

THE DEJECTIVES OF THIS EXPERIMENT WILL BE TO MEASURE DIRECT SOLAR EXTINCTION AS THE PROBE DESCENDS. TO MEASURE THE SCLAR AUREOLE, AND TO OBTAIN A CRUDE PICTURE OF CLOUD STRUCTURE FROM BACKSCATTERED SUNLIGHT. A SINGLE NARROW-FIELD-DF-VIEW SENSOR WILL BE USED TO DETECT DIRECT AND SCATTERED SUNLIGHT. AS THE PROBE ROTATES. THE SENSOR WILL MEASURE THE AZIMUTHAL VARIATION OF SCATTERED SUNLIGHT.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - DIFFERENTIAL VERY-LONG-BASELINE INTERFERENTIAL TRACKING

NSSCC IC P1078P8-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: 01=OTHER INVESTIGATOR) CAMBRIDGE. MA PETTENGILL MIT PL - G. CAMBRIDGE . MA MIT 01 - J. CHARNEY CAMBRIDGE, MA MIT 01 - 1.1. SHAPIRO CANERIDGE. MA 01 - R. PRINN MIT

# EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACE(RAFT) IN CROER TO INFER OF PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS\* ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED. IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS\* GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- PIGNEER VENUS FROBE C NSSCC ID PIO78PC PIGNEER VENUS 1978. PIGNEER VENUS SMAL PROBE ALTERNATE NAMES-

PLANNED LAUNCH DATE- 05/00/78

SPACECRAFT WEIGHT IN CRBIT-

1.5 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES

LAUNCH VEHICLE+

FUNDING AGENCY UNITED STATES

NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=FROJECT SCIENTIST)

PM - R.R. NUNAMAKER

NASA-ARC

MOFFET FIELD . CA

PS - L. COLTN NASA-ARC

MCFFET FIELD. CA

# SPACECRAFT BRIEF DESCRIPTION

THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF. TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PICKEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY DEJECTIVE OF THE IWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS! ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET. THE NATURE AND COMPOSITION OF THE CLOUDS: THE CIRCULATION PATTERN OF THE ATMOSPHERE. AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED. AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TC 20 DAYS BEFCRE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE. WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE EUS IS CESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT. THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS. WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSEC 1C FIC78PC-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - A. SEIFF SOMMER 01 - 5.

NASA-ARC NASA-ARC

MOFFETT FIELD, CA MOFFETT FIELD. CA

01 - 0. KIRK NASA - AR C

MOFFETT FIELD, CA

OI - R. BLANCHARD NASA-ARC

MOFFETT FIELD , CA

## EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR. AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAET VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R71C6-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO CETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES. AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.8 OF W FOMER.

ON 06/14/73. THE SPACECRAFT MISSICN WAS APPREVED.

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND CISTRIBUTION

NESDC ID FIC78FC-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.E. BLAMONT U OF PARIS PARIS, FRANCE
DI - B. RAGENT NASA-ARC MOFFETT FIELC. CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELDMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH FROME WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.5 KG AND WILL USE ABOUT 1.2 W OF FOWER.

ON 06/14/73. THE SPICECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING

NSSCC IC PIO78PC-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR) CANERIDGE. NA PETTENGILL MIT PI - G. 01 - 1.1. CAMBRIDGE, MA SHAPIRO TI M CAMBRIDGE, MA PRINN MIT 01 - R. CAMERIDGE. NA MIT CHARNEY 01 - J.

#### EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OF PLACE LIFER LIMITS ON WIND SFEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS. ATMOSPHERE. DATA TAKEN FRICE TO PROBE ENTRY WILL BE USED. IF FEASIBLE. TO INFER CHARACTERISTICS OF VENUS. GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

SPACECRAFT COMMON NAME- PIONEER VENUS FROBE D NSSDC ID FIC78PD ALTERNATE NAMES- PIONEER VENUS 1978, PIONEER VENUS SMAL PROBE

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN CRBIT- 1.5 KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES

NASA-CSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)

PM - R.R. NUNAMAKER NASA-ARC MOFFET FIELD. CA
PS - L. COLIN NASA-ARC MCFFET FIELD. CA

#### SPACECRAFT ERIEF DESCRIPTION

THIS PICNEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF. TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PICKEER VENUS ORBITER. IS SCHECULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY DEJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER CETAILED INFURMATION ON VENUS! ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED. AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE. WHILE THE THEEE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE EUS IS CESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT. THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 EPS. WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSDC IC FIC78FD-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=(THEF INVESTIGATOR)
PI - A. SEIFF NASA-ARC MOFFETT FIELD. CA

DI + S. SOMMER NASA-ARC MOFFETT FIELD. CA
DI + D.A. KIRK NASA-ARC MOFFETT FIELD. CA
OI - R. BLANCHARD NASA-ARC MOFFETT FIELD. CA

## EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAET VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R71C6-2C01). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO CETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.6 % FOWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLCUC EXTENT. STRUCTURE. AND DISTRIBUTION

NSSDC ID FIC78 PD-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)

PI - J.E. BLAMONT U OF PARIS FARIS. FRANCE

OI - B. RAGENT NASA-ARC MOFFETT FIELD. CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER GIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.5 KG AND WILL USE ABOUT 1.2 W OF FOWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING

NSSCC IC P1078PD-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) MIT CAMERIDGE. MA PETTENGILL PI - G. CAMBRIDGE, MA 01 - 1.1. M IT SHAPIRC CAMBRIDGE, MA MIT OI - R. PRINN CAMERIDGE. MA MIT 61 - J. CHARNEY

# EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIC SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) TO INFER OR PLACE LIFER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN FRICK TO FROEE ENTRY WILL BE USED. IF FEASIBLE. TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPREVED.

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SPACECRAFT COMMON NAME- PIONEER VENUS PROBE E NSSDC ID PIO78PE ALTERNATE NAMES- PIONEER VENUS 1976. FICNEER VENUS SMAL FROBE

PLANNED LAUNCH DATE- 05/00/78 SPACECFAFT WEIGHT IN ORBIT- 1.5 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES
NASA-CSS

SPACE CRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.R. NUNAMAKER PS - L. COLIN NASA-ARC. NASA-ARC MOFFET FIELD. CA

# SPACECRAFT BRIEF DESCRIPTION

THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIF. FICKER VENUS ORBITER. IS SCHEDULED TO GO INTO ORBIT ARCUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUE' ATMOSPHERE AND CLOUDS. INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET. THE NATURE AND COMPOSITION OF THE CLOUDS. THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROFE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE. WHILE THE THREE SMALLER PROCES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE EUS IS CESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BES.

ON 06/14/73, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSDC ID PIO78PE-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) PI - A. SEIFF NA SA - AR C . MOFFETT' FIELD. CA OI - 5. SOMMER NASA-ARC MOFFETT FIELD , CA 0I - R. BLANCHARD NASA-LARC LANGLEY FIELD. VA 01 - D.A. KIRK NASA-ARC MOFFETT FIELD. CA

#### EXPERIMENT ERIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELERGMETER. A PRESSURE SENSOR. AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAET VEHICLE (FLANETARY ATMOSPHERE EXPERIMENT TEST R7106-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELUCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.8 W POWER.

ON 06/14/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLCUD EXTENT. STRUCTURE AND DISTRIBUTION NESDC IC FIC78FE-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=DTHER INVESTIGATOR)
PI - J.E. ELAMONT U CF PARIS PARIS. FRANCE
OI - B. RAGENT NASA-ARC MCFFETT FIELD, CA

# EXPERIMENT GRIEF CESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKS CATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIDDE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKS CATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROCE. COMPARISONS OF THE SIGNALS FROM EACH PRIME WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.5 KG AND WILL USE ABOUT 1.2 W OF POWER.

ON 06/14/73. THE SPACECRAFT MISSION WAS AFFROVED.

EXPERIMENT NAME- CIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING

NSSDC ID PIC78FE-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. GI=OTHER INVESTIGATOR) CAMERIDGE. MA MIT PI - G. PETTENGILL CAMERICGE. MA SHAPIRO MIT 01 - 1.1. CAMBRIDGE . NA MIT PRINN 01 '- R. CAMERIDGE: MA

MIT

# EXPERIMENT BRIEF DESCRIPTION

01 - J.

CHARNEY

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (BRBITING SPACECRAFT) TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MCCELLING THE CIRCULATION PATTERNS OF VENUS\* ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED. IF FEASIBLE. TO INFER CHARACTERISTICS OF VENUS! GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73. THE SPACECRAFT MISSICH WAS APPROVED.

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SPACECRAFT COMMON NAME- SARI ALTERNATE NAMES-

NSSDC ID SARI

SPACECRAFT WEIGHT IN CREIT-ΚG PLANNED LAUNCH DATE- 00/00/76

LAUNCH VEHICLE- DIAMANT LAUNCH SITE- KOUROR, FRENCH GUIANA, FRANCE

FUNDING AGENCY FRANCE

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERICO- MIN .
APDAPSIS- 1500.00 KM ALT PERIAPSIS- 300.000 KM ALT INCLINATION-90. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FROJECT SCIENTIST) UNKNOWN PM -UNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF FRANCE'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE SATELLITE'S DEJECTIVES WILL INCLUDE THE STUDY OF THE THERNAL PLASMA WITHIN THE MAGNETCSPHERE AND THE STUDY OF THE STRUCTURE AND ORIGINS OF NATURAL VLF NOISE. THE EXPERIMENTS WILL INCLUDE TRIAXIAL MAGNETIC AND ELECTRIC FIELD ANTENNAS (OF THE SPHERE DIPOLE TYPE) AND LOW-ENERGY ELECTRON DETECTORS IN THE ENERGY RANGE 5 TO 500 EV.

ON 01/10/73, THE SPACECRAFT MISSICN WAS PROFUSED.

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SPACECRAFT COMMON NAME- SAS-C ALTERNATE NAMES-PL-7430 NSSDC ID SAS-C

PLANNED LAUNCH DATE- 04/00/74

SPACECRAFT WEIGHT IN ORBIT-

LAUNCH SITE- SAN MARCO FLATFORM. OFF COAST OF KENYA

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

UNITED STATES

NASA-CSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC APOAPSIS- 555.000 KM ALT

ORBIT PERICE- Se. MIN PER IAPSIS- EEE. COG KN ALT

INCLINATION-

2.9 DEG

SPACECRAFT PERSUNAEL (PM=PROJECT MANAGER. FS=PROJECT SCIENTIST) TEWNSEND PM - M.R.

NASA-GSFC

GREENBELT. MD

PS - C.E. FICHTEL NASA-GSFC

GREENBELT, MO

## SPACECRAFT ERLEF DESCRIPTION

SAS-C WILL BE THE THIRD OF A SERIES OF SMALL SPACECRAFT WHOSE OBJECTIVES WILL BE TO SURVEY THE CELESTIAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY. GAMMA-RAY. UV. AND OTHER SPECTRAL REGIONS. THE PRIMARY MISSIONS OF SAS-C WILL BE TO MEASURE THE X-RAY EMISSION OF CISCRETE EXTRAGALACTIC SOURCES. TO MONITOR THE INTENSITY AND SPECTRA OF GALACTIC X-RAY SOURCES FROM 0.2 TO 80 KEV, AND TO MONITOR THE X-RAY INTENSITY OF SCO-X-1. THE SPACECRAFT WILL BE LAUNCHED FROM THE SAN MARCE PLATFORM OFF THE CUAST OF KENYA, AFRICA, INTO A NEAR CIRCULAR EQUATORIAL ORBIT. FOUR SOLAR PADDLES WILL BE USED IN CONJUNCTION WITH A 12-CELL NICKEL-CADMIUM BATTERY TO PROVIDE 40 W OF AVERAGE POWER OVER THE ENTIRE OFBIT. THE SPACECRAFT WILL BE SPIN STABILIZED ALONG THE Z AXIS AND WILL ROTATE AT ABOUT 0.1 CEG/SEC. CHANGES TO THE SPIN AXIS DRIENTATION WILL BE BY GROUND COMMAND, EITHER IN REAL TIME OF DELAYED. THE SPIN AXIS CAN BE NADE TO DITHER EACH AND FORTH PLUS OR MINUS 2.5 DEG ACROSS A SELECTED SDURCE AT 0.01 DEG/SEC. THE EXPERIMENTS CAN LUCK ALONG THE Z AXIS OF THE SPACECRAFT, PERPENDICULAR TO. IT . OR AT AN ANGLE .

ON 03/03/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES NSSCC ID SAS-C -01

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR).

	- G	- N	CLARK	MIT	CAMERIDGE. MA	
		, - •		MIT	CAMBRIDGE . MA	
			BRADT	MIT	CAMERIDGE. MA	
O I	<b>-</b> ≥,	.H.G.	LEWIN	****	CAMERIDGE. MA	
ΩĪ	- H	W .	SCHNOPPER	MIT	CAMENIDAC! WY	

# EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVESTIGATE THE EXISTENCE OF VERY WEAK EXTRAGALACTIC X-RAY SOURCES. THE INSTRUMENT WILL VIEW A 100-DEG-SC REGION OF THE SKY AROUND THE DIRECTION OF SPIN AXIS OF THE SATELLITE. THE NOMINAL TARGETS FOR A 1-YR STUDY WILL BE (1) THE VIRGO CLUSTER OF GALAXIES FOR 5 MONTHS, (2) THE GALACTIC EQUATOR FOR 1 MONTH. (3) THE ANDRONEDA NEBULA FOR 3 MONTHS. AND (4) THE LARGE MAGELLANIC CLOUD FOR 3 MONTHS. THE INSTRUMENTATION WILL CONSIST OF A 4-ARC-MIN FULL-WIDTH HALF-MAXIMUM MODULATION COLLIMATOR AND FIVE PROPORTIONAL COUNTERS SENSITIVE OVER THE ENERGY RANGE FROM 1.5 TO 10 KEV. THE ASPECT SYSTEM WILL PROVIDE INFORMATION ON THE ORIENTATION OF THE COLLIMATOR TO AN ACCURACY OF 15 ARC-SEC.

ON 03/03/69: THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ANALYSIS OF GALACTIC X-RAY SCURCES ... NESCC ID SAS-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: DI=OTHER INVESTIGATOR)

PI - G.W. CLARK MIT CAMBRIDGE: MA

DI - H.V.D. BRADT MIT CAMBRIDGE: MA

DI - W.H.G. LEWIN MIT CAMBRIDGE; MA

DI - H.W. SCHNOPPEF MIT CAMBRIDGE: MA

# EXPERIMENT BRIEF DESCRIPTION

THE DEJECTIVES OF THIS EXPERIMENT WILL BE TO LOCATE GALACTIC X-RAY SOURCES TO 15 ARC-SEC AND TO MONITOR THE CELESTIAL SKY FOR FLARES. A 2-MIN. FULL-WIDTH HALF-PAXIMUM MODULATION COLLIMATOR. CONSISTING OF NINE SECTIONS WITH THE LINES OF MAXIMUM TRANSMISSION OF EACH SECTION ROTATED BY 20 DEG FROM THE PREVIOUS ONE. WILL BE USED TO DETERMINE SCURCE LOCATIONS WHILE THE SATELLITE IS BEING ROTATED EACK AND FORTH FLUS OR WINUS 5 DEG AT THE RATE OF 0.6 ARC-MIN/SEC. THREE COUNTERS WITH THREE ANGDES EACH WILL DETECT THE X-RAYS IN THE ENERGY RANGE OF 1.8 TO 8 KEY. EACH OF THE NINE ANDCES WILL HAVE ITS OWN CHANNEL. ALLOWING EACH OF THE NINE SECTIONS OF THE COLLIMATOR TO BE ANALYZED SEPARATELY. THE POINT OF INTERSECTION OF THE LINES OF POSITION IN NINE DIFFERENT DIRECTIONS WILL BE THE LOCATION OF THE X-RAY SCURCE. THE MONITORING OF THE CELESTIAL SKY WILL BE ACCEMPLISHED BY USING THREE SLAT COLLIMATORS, EACH 0.5 BY 50 DEG FULL-WIDTH HALF-WAXINUM. THE COLLIMATORS WILL BE ORIENTED SO THAT THREE LINES OF POSITION WILL BE OBTAINED FOR ANY GIVEN SOURCE WHEN THE SATELLITE IS BEING SOUN AT A STEADY RCTATION OF 4 ARC-MIN/SEC ABOUT THE Z AXIS.

ON 03/03/69, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME+ CONTINUOUS X-RAY FLUCTUATION MONITOR OF INSSCRIBE SAS-C +03 SCO X-1

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTHER INVESTIGATOR)

PI - G.W. CLARK MIT CAMBRIDGE, MA

OI - H.V.D. ERACT MIT CAMBRIDGE, MA

OI - W.H.G. LEWIN MIT CAMBRIDGE, MA

OI - H.W. SCHNOPPER MIT CAMBRIDGE, MA

#### EXPERIMENT BRIEF DESCRIPTION

NINE ENERGY INTERVALS FROM 0.4 TO 80 KEV WILL BE MONITORED TO STUDY THE OVERALL INTENSITY VARIATIONS AS WELL AS THE CHANGES IN THE ERCAD SPECTRUM AND IN THE INTENSITIES OF LINE EMISSIONS. THE COLLIMATOR WILL BE INCLINED BY APPROXIMATELY 31 DEG WITH RESPECT TO THE EQUATORIAL PLANE OF THE SATELLITE. WITH THE AXIS OF ROTATION POINTING TOWARD THE VIRGO CLUSTER OF GALAXIES, THE COLLIMATOR WILL VIEW SCORPIO FOR 140 DEG DURING EACH REVOLUTION OF THE SATELLITE. THE COLLIMATOR WILL BE A 12- BY 70-DEG (FULL-WIDTH HALF-MAXIMUM) SLAT COLLIMATOR.

ON 03/03/69. THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- X-RAY ABSORPTION CONTOURS OF THE GALAXY NSSDC 1D SAS-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR)

PI - G.W. CLARK MIT CAMERICGE. MA

OI - H.V.D. BRADT MIT CAMERIDGE. NA

OI - W.H.G. LEWIN MIT CAMERIDGE, MA

OI - H.W. SCHNOPPER MIT CAMERICGE. MA

#### EXPERIMENT BRIEF DESCRIPTION

THE DENSITY AND DISTRIBUTION OF INTERSTELLAR MATTER WILL SE DETERMINED BY MEASURING THE VARIATION IN THE INTENSITY OF THE LOW-ENERGY DIFFUSE EXTRAGALACTIC X-RAY BACKGROUND IN THE RANGE OF 0.2 TO 10 KEV AS A FUNCTION OF GALACTIC LATITUDE. TWO IDENTICAL DETECTION SYSTEMS WILL BE USED. EACH WITH A NEARLY CIRCULAR FIELD OF VIEW OF 3 DEG FULL-WIDTH HALF-MAXIMUM. THE FIELDS OF VIEW WILL BE CENTERED, RESPECTIVELY, 5 DEG ABOVE AND 5 DEG BELOW THE EQUATORIAL PLANE OF THE SATELLITE.

ON 03/03/69. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT CCMMON NAME- IUE NSSDC ID SAS-D
ALTERNATE NAMES- INT. ULTRAVIOLET EXFL., SAS-D

PLANNED LAUNCH DATE- 00/00/76 SPACECRAFT WEIGHT IN CRBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES
NASA-GSS

INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEGGENTRIC ORBIT PERIOD- 1440. NIN
APDAPSIS- 38000. KM ALT PERIAPSIS- 38000. KM ALT INCLINATION- 28.9 DE

SPACECRAFT PERSONNEL - (PM=PRCJECT - MANAGER, FS=PRCJECT SCIENTIST)
PM + G.W. LONGANECKER NASA-GSFC GREENEELT. - MC

PS - C.E. FICHTEL BOGGESS III PS - A.

NASA-GSFC NASA-CEFC GREENBELT. MD GREENBELT. ND

SPACECRAFT BRIEF DESCRIFTION

THE INTERNATIONAL CUTRAVIOLET EXPLORER IS THE FOURTH IN A PLANNED SERIES OF SMALL ASTRONOMICAL SATELLITES. THE OBJECTIVE OF THIS SATELLITE WILL BE TO OBTAIN ULTRAVIOLET SPECTRA OF STARS. PLANETS, AND OTHER CELESTIAL UBJECTS. THE SATELLITE IS TO BE JUINTLY BUILT AND CREFATED BY NASA. THE SPACE RESEARCH COUNCIL OF THE UNITED KINGDOM. AND THE EUROPEAN SPACE RESEARCH ORGANIZATION. MOST OF THE OBSERVING TIME WILL BE ALLOCATED TO GUEST OBSERVERS. THE SATELLITE WILL BE LAUNCHED INTO A GECSYNCHRONOUS ORBIT LATE IN 1976. THE EASIC SCIENTIFIC PACKAGE WILL CONSIST OF A 45-CM. F/15 CASSEGRAIN TELESCOPE WITH A FIELD-CF-VIEW OF 10 ARC-MIN. THE ANALYSIS OF THE PHOTON DATA WILL BE MADE WITH A TWO-CAMERA. ECHELLE SPECTROGRAPH. USING A SEC VIDICON AS A DETECTOR. THE TWO CAMERAS WILL COVER THE SPECTRAL RANGES 1200 TC 1050 A AND 1800 TO 3300 A. THE SPECTROGRAPH CAN OPERATE EITHER IN A HIGH-RESOLUTION (0.1 A) OR LOW-RESOLUTION (& A) MGDE.

ON 12/15/72, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- SPACE SHUTTLE ALTERNATE NAMES-

NSSDC ID SHUTTLE

PLANNED LAUNCH DATE- 12/00/78

SPACECRAFT WEIGHT IN CREIT-

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEFICLE-

FUNDING AGENCY

UNITED STATES

NASA-CMSF

PLANNED GREIT PARAMETERS

URBIT TYPE- GEOCENTRIC KM ALT APOAPSIS-

DREIT PERICE-PER IAPS IS-

MIN INCLINATION-KM ALT

DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=FROJECT SCIENTIST)

MAIKIN PM - M.S. PM - R. THOMPSON NASA HEADQUARTERS NASA-JSC

WASHINGTON. DC

HEUSTEN. TX

SPACECRAFT ERIEF DESCRIPTION

THE SPACE SHUTTLE PROJECT WILL CONSIST OF A SERIES OF REUSABLE SPACE TRANSPORTATION SYSTEMS THAT WILL BE USED IN THREE DIFFERENT WAYS -- (1) TO CARRY AUTOMATED SATELLITES TO NEAR-EARTH CRBIT FROM WHICH THEY MAY BE LAUNCHED TO HIGHER ALTITUDES WITH ADDITIONAL BOOSTER STAGES. (2) TO LAUNCH MAJOR AUTOMATED SATELLITES INTO NEAR-EARTH ORBIT AND TO PROVIDE REVISIT AND MAINTENANCE OPPORTUNITIES. AND (3) TO CARRY SCIENTIFIC EQLIFMENT INTO GREIT AND RETURN TO EARTH AFTER PERIODS OF 7 TO 30 DAYS (SCRTIE MISSIGNS). THE \*FINAL REPORT OF THE SPACE SHUTTLE PAYLOAD PLANNING WORKING GROUPS\* (NASA-GSEC, MAY 1973) PROPOSES THAT EXPERIMENTS BE CARRIED OUT IN THE FOLLOWING MAJOR FIELDS -- (1) ASTRONOMY, USING A LARGE SPACE TELESCOPE (LST) AND SEVERAL OTHER IR AND UV TELESCOPES. (2) ATMOSPHERIC AND SPACE PHYSICS. USING TRACER RELEASE TECHNIQUES, (3) HIGH-ENERGY ASTROPHYSICS (X-RAY ASTRONOMY, STRUCTURE AND DYNAMICS OF THE INTERSTELLER MEDIUM), USING VARIOUS TELESCOPES. SPECTROMETERS, PROPORTIONAL COUNTER ARRAYS, AND PROBES. (4) LIFE SCIENCES. AN AGGREGATE OF RELATED RESEARCH AND TECHNOLOGY EFFORTS INCLUDING

PLANETARY BIOLOGY. BROMIDICINE, BIOLOGY, AND ADVANCED TECHNOLOGY. (5) SOLAR PHYSICS, USING VARIOUS POLARIMETERS, SCIENTILLATORS, PROPORTIONAL COUNTERS, SPARK CHAMBERS, AND NEUTRON DETECTORS, (6) COMMUNICATIONS AND NAVIGATION, (7) EARTH OBSERVATIONS. INCLUDING MONITCRING OVER LONG PERIODS OF TIME OF THE PHYSICAL STATE AND CYNAMIC BEHAVIOR OF THE EARTH'S LAND SURFACE FEATURES AS WELL AS THE CTHER ELEMENTS OF GLOBAL ENVIRONMENT (AIR. WATER. AND ICE). (8) EARTH AND OCEAN PHYSICS, (9) MATERIALS PROCESSING AND SPACE MANUFACTURING. AND (10) SPACE TECHNOLOGY. APPROXIMATELY 445 LAUNCHES HAVE BEEN PROPOSED. TO COVER A PERIOD OF 12 YEARS.

ON 05/00/73. THE SPACECRAFT MISSICH WAS PROPOSED.

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SPACECRAFT COMMON NAME~ SIRIO-A ALTERNATE NAMES -

NSSDC ID SIRIO-A

PLANNED LAUNCH CATE- 00/00/74

SPACECRAFT WEIGHT IN ORBIT-

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY . ITALY

PLANNED CREIT PARAMETERS

ORBIT TYPE- GEOCENTRIC APGAPSIS- 35700. KM ALT ORBIT PERIOD- 1440. MIN

PERIAPSIS- 35700. KM ALT INCLINATION-

O. DEG

SPACECRAFT PERSONNEL (PM=FRCJECT MANAGER, FS=FRGJECT SCIENTIST)

SPACECRAFT ERIEF CESCRIPTION

THIS SATELLITE WILL BE PRIMARILY A GEOSTATICNARY COMMUNICATIONS SATELLITE. IT WILL INCLUDE EXPERIMENTS MEASURING THE LOCAL PLASMA AND FIELD ENVIRONMENT AND THE FLUX OF LOW-ENERGY CCEMIC RAYS. THE SATELLITE POINT WILL BE LOCATED AT 15 DEG W LONGITUDE.

UN 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- SKYLAB CSM-3 ALTERNATE NAMES -

NEEDC TO SL-4

PLANNED LAUNCH DATE- 10/00/73 SPACECRAFT WEIGHT IN ORBIT- 6033. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- SATURN 18

FUNDING AGENCY UNITED STATES

NASA-OMSF

PLANNED DREIT PARAMETERS

ORBIT PERIOD-SQ. MIN DRBIT TYPE- GEOCENTRIC 50 . DEG PERIAPSIS- 435. KM ALT INCL INAT ION-435. KM ALT APOAPS IS-

SPACE CRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FROJECT SCIENTIST) HCLSTCN, TX NA SA - JSC PM - C.G. SMITH

SPACECRAFT ERIEF CESCRIPTION

THIS SPACECRAFT WILL BE ALMOST IDENTICAL TO THE COMMAND AND SERVICE MODULE USED FOR APOLLO MISSIONS. MODIFICATIONS WILL BE MADE TO ACCOMPDATE LONG-DURATION SKYLAR MISSIONS AND TO ALLOW THE SPACECRAFT TO REMAIN SEMI-DERMANT WHILE COCKED TO THE SKYLAB CLUSTER. A CREW OF THREE MEN AND THEIR PROVISIONS WILL BE CARRIED. THE MISSION OF THIS SPACECRAFT WILL BE TO FERRY A CREW OF THREE TO THE SKYLAB COMPLEX AND RETURN THEN TO EARTH.

ON 01/00/67, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- POTATO RESPIRATION

NSSDC ID SL-4 -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) SPACE DEFENSE CORP EIRMINGHAM, MI PINCE PI - 8.W. NORTHWESTERN L EVANSTON. IL BROKN. JR. 01 - F.A.

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, CARRIED IN THE CEM, WILL DETERMINE THE EFFECT OF REMOVING THE EARTH'S REYTHMIC GEOFFYSICAL ENVIRONMENT ON THE RESPIRATORY BIORHYTHM OF A PETATO.

ON 01/00/67. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ECCY FLUID BIOASSAY

NSSDC ID SL-4 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) HOUSTON. TX NASA-JSC PI - (.5. 1.#ACH

EXPERIMENT BRIEF DESCRIPTION

THE PUPPOSE OF THIS SKYLAB EXPERIMENT WILL BE TO ASSESS THE EFFECT OF SPACE FLIGHT EN ENDUCRINE-METABOLIC FUNCTIONS, INCLUDING FLUID AND ELECTROLYTE CONTROL MECHANISMS. THE DATA TO BE COLLECTED IN SUPPORT OF MO73 WILL INCLUDE -- TAILY BODY WEIGHT. ACCURATE FOOD INTAKE (QUANTITY AND COMEGSITION), ACCURATE FLUID INTAKE, VOLUME OF A 24-ER URINE OUTPUT, SAMPLES OF POCLED 24-FR UPINE OUTPUT (CULLECTED AND PROCESSED INFLIGHT FOR RETURN AND POSTFLIGHT ANALYSIS). AND PREFLIGHT. INFLIGHT. AND POSTFLIGHT BLOOD SAMPLES TAKEN FOR ANALYSIS. URINE WILL BE ANALYZED FOR SCOTUM. PCTASSIUM. ALD ESTERONE, EPINEPHRINE, NOREFINEPHRINE, ANTIDI CRETIC HORMONES (ADH), URINE OSMCLALITY, HYDROCORTISCNE, TOTAL BODY WATER, AND TOTAL AND FRACTIONAL KETUSTERBIDS. BLOOD WILL BE ANALYZED FOR RENIN. SCOTUM. POTASSIUM. CHLORIDE, PLASMA OSMOLALITY, EXTRACELLULAR FLUID VOLUME (ECF), PARATHYROID HORMONE, THYROCALCITONIN, THYROXINE, ADRENCCORTICCTROFIC FORMONE (ACTH). HYDRUCCRTISCHE. AND TOTAL BODY WATER. ALL FARDWARE USED IN MO73 WAS A PART OF OTHER SYSTEMS. HARDWARE USED IN THIS EXPERIMENT. ALONG WITH THE SYSTEMS OF WHICH THEY ARE A PART. INCLUDED THE URINE MEASUREMENT AND COLLECTION SYSTEM (A PART OF THE HABITABILITY SUPPORT SYSTEM). THE SPECIMEN MASS MEASUREMENT (A PART OF MO74 (73-0274-26)). AND THE EOCY MASS MEASUREMENT (A PART UF M172 (73-027A-32)).

ON 01/00/67. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT CUMMON NAME- SAN MARCO C-2 ALTERNATE NAMES-

1600. KM ALT

NSSCC ID SMAR-C2

PLANNED LAUNCH DATE- 01/15/74

SPACECRAFT WEIGHT IN ORBIT-

KG

LAUNCH SITE- SAN MARCE PLATFORM. OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNCING AGENCY

UNITED STATES

NASA-OSS

CRA

PLANNED OREIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERICE-

MIN

180. KN ALT INCLINATION-

DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=FROJECT SCIENTIST)

PM - A.J. CAPORALE

NASA-GSEC

PERIAPSIS-

GREENBELT, MD

FS - G.P. NEWTON

NASA-GSEC

GREENEELT. NO

SPACECRAFT ERIEF DESCRIPTION

THE ITALIAN-BUILT SAN MARCO C-2 SPACECRAFT WILL BE FART OF A COOPERATIVE SPACE EFFORT BETWEEN THE ITALIAN SPACE COMMISSION (CRS) AND NASA. THE SCIENTIFIC OBJECTIVE OF SAN MARCO C-2 WILL BE TO PROVIDE MEASUREMENTS OF THE DIURNAL VARIATIONS OF EQUATORIAL NEUTRAL THERMOSPHERE DENSITY, COMPOSITION, AND TEMPERATURE FOR CORRELATION WITH SIMULTANEOUS ATMOSPHERIC EXPLORER C (AB-C) DATA, TO BE USED IN STUDIES OF THE PHYSICS AND DYNAMICS OF THE LOWER THERMOSPHERE, THE SPACECRAFT WILL CARRY (1) A NEUTRAL ATMOSPHERE COMPOSITION EXPERIMENT (NACE) TO DETERMINE UPPER ATMOSPHERIC (160 KM AND ABOVE) CONCENTRATIONS OF ARGON, FELIUM, ATOMIC DXYGEN AND MOLECULAR DXYGEN AND NITROGEN, (2) A NEUTRAL ATMOSPHERIC TEMPERATURE EXPERIMENT TO DETERMINE THE TEMPERATURE OF AMBIENT MOLECULAR NITROGEN AND (3) AN ACCELEROMETER TO MEASURE ATMOSPHERIC DENSITY NEAR SATELLITE PERIGEE.

ON 06/00/73. THE SPACECRAFT MISSICH WAS APPRICADED.

EXPERIMENT NAME- ATMOSPHERIC GRAG DENSITY ACCELEROMETER NESDC ID SMAR-C2-01

EXPERIMENT PERSONNEL (FI=PRINCIPAL INVESTIGATOR: CIRCUTHER INVESTIGATOR)
PI - L. BROGLIC NATH RSCH CNCL ITALY ROME. ITALY

## EXPERIMENT BRIEF DESCRIPTION

THE STRUCTURE OF THE SAN MARCE C+2 SPACECRAFT WILL FORM AN INTEGRAL PART OF THE DRAG BALANCE EXPERIMENT. THE OUTER SHELL OF THE SPACECRAFT WILL BE CONNECTED THROUGH A SERIES OF FLEXIBLE ARMS TO A HEAVIER INTERNAL STRUCTURE. THE CRAG BALANCE SYSTEM WILL MEASURE THE RELATIVE TRANSLATIONS ALONG THREE OFTHOGONAL AXES. BY APPLYING A DRAG COEFFICIENT TO THE MEASURED FORCES. THE ATMOSPHERIC CENSITY CAN BE CETAINED. DENSITY VALUES CETAINED FROM THIS EXPERIMENT WILL BE CORRELATED WITH SIMULTANEOUS MEASUREMENTS

UBTAINED FROM EXPERIMENTS TO BE FLOWN ON ATMOSPHERIC EXPLORER C (AE+C). ON 00/00/73. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- MELTRAL ATMOSPHERE COMPOSITION

NESCC IC SMAR-CZ-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) GREENBELT, MD NASA-GSEC PI - G.P. NEWTON GREENEELT. NO NASA-GSEC 01 - N.W. SPENCER

EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT WILL BE FLOWN AT EQUATORIAL LATITUDES TO DETERMINE THE CONCENTRATIONS AND TEMPORAL (INCLUDING DIURNAL) FLUCTUATIONS OF THE FULLIWING NEUTRAL UPPER ATMOSPHERE CONSTITUENTS -- ARGON, MCLECULAR AND ATOMIC CXYGEN. MCLECULAR NITROGEN. AND HELIUM. THE MEASUREMENTS CETAINED WILL BE CORRELATED WITH APPROPRIATE ATMOSPHERIC EXPLORER C DATA. A MAGNETIC MASS SPECTROMETER WILL BE USED.

ON 06/00/73. THE SPACECRAFT MISSIUN WAS APPROVED.

EXPERIMENT NAME- NEUTRAL ATMOSPHERE TEMPERATURE

NSSDC IE SMAR-C2-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) GREENEELT, MD NASA+GSEC PI - N.W. SPENCER

EXPERIMENT ERIEF DESCRIFTION

THIS EXPERIMENT WILL BE FLOWN TO CETERAINE BY DIRECT MEASUREMENT THE TEMPERATURE AND DENSITY OF MOLECULAR NITROGEN AT SEVERAL ALTITUDES IN THE UPPER ATMOSPHERE. THE CATA CETAINED WILL BE USED TO STUDY TEMPORAL FLUCTUATIONS, AND THEY WILL ALSO BE CORRELATED WITH ATMOSPHERIC EXPLORER C MEASUREMENTS. THE SENSOR WILL BE A SMALL CMEGATRON TUNED TO MEASURE MOLECULAR NITROGEN, AND WILL HAVE A SPECIALLY SHAFED APERTURE. TEMPERATURE WILL BE MEASURED DURING A SPIN-SCAN BY DESERVING THE RESPONSE AS A FUNCTION OF ANGLE WITH THE SATELLITE VELOCITY VECTOR.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

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NESDC ID SMS-A SPACECRAFT COMMON NAME- SMS-A PL-712D. SYNCH MTECROLOGIL SAT A. SYNC MET SAT A ALTERNATE NAMES-

SFACECRAFT WEIGHT IN CREIT-243. KG FLANNED LAUNCH PATE- 10/00/73

LAUNCH VEHICLE- DELTA LAUNCH SITE- CAFE KENNEDY. UNITED STATES

FUNDING AGENCY UNITED STATES

NOAA-NESS

PLANNED OREIT PARAMETERS

ORBIT TYPE+ GEOCENTRIC DREIT PERICE- 1440. MIN APDAPSIS- 35700. KM ALT

PERTAPSIS- 35700. KM ALT INCLINATION-

0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - 0.V. FORDYCE NASA-GSEC GREENBELT, NO PS - W.E. SHENK NASA-GSEC GREENEELT. NO

SPACECRAFT BRIEF DESCRIPTION

THE SMS-A WILL BE A NASA-DEVELOPED, NOAA-CPERATED SFACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO FROVIDE FIGH QUALITY DAY/NIGHT CLOUD COVER DATA AND TO TAKE RADIANCE TERFERATURES OF THE EARTH/ATMOSPHERE SYSTEM: (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL MEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENTAL MONITOR (SEM) SYSTEM TO MEASURE PROTON. ELECTRON. AND SCLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN AUDITICHAL 83 CM EEYCAD THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A FONEYCOMBED EQUIPMENT SHELF AND A THRUST TUBE. THE VISSE TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL AFERTURE IN THE SPACECRAFT'S SIDE. A SUFFORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SELAR PANELS, WHICH WILL FORM THE DUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAFED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CENTEGL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RFM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER WHE TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A EACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONGUS CRBIT.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RACIOMETER NSSDC ID SMS-A -01 (VISSR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR) NESS STAFF NEAA-NESS SUITLAND. MC.

# EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-A WILL BE CAPABLE OF FROVIDING DAY/NIGHT COSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS. SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PAPTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL . USE A COMMON EPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAFED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSE UPTICAL AXIS. WEICH WILL BE ALIGNED FARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM)

WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SFIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING FIFTCE NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH. WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES EETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSE OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLOPS ISLAND. VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE STURED AND TIME STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REEROADCAST AT APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA. THE VISSE CATA WILL BE FANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASSEVILLE. NORTH CAROLINA, FOR ARCHIVING.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC ID SMS-A -02

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR) CI=(THER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIFTION

A NUMBER OF SEPARATE SILICON SCLID-STATE DETECTORS. EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR FULSE AMPLIFICATION AND PULSE HEIGHT DISCRIMINATION, WILL BE USED TO DETAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE FANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 4 CO MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

EN 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSCC IC SMS-A -03

EXPERIMENT PERSUNNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI + D.J. WILLIAMS NCAA-ERL ECULDER, CO

EXPERIMENT ERIEF CESCRIFTICN

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLINATOR. TWO IONIZATION CHAMBERS. AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR. WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE DNCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BEFYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TG 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH BANGE 0.5- TG 3-A.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID SMS-A -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTFER INVESTIGATOR) NO AA - ER L PI - D. J. WILLIAMS BOULDER . CO

EXPERIMENT BRIEF DESCRIPTION

A BLAXIAL. CLOSEC-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (AFPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE FANGE (+50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (FLUS OF MINUS 1200 GAMMAS IN 40-GAMMA STEPS). AND AN INFLIGHT CALIBRATION CAPABILITY.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEGROLEGICAL DATA COLLECTION AND NESCO IC SMS-A -05 TRANSMISSION SYSTEM

EXPERIMENT PERSONNEL (PI = PRINCIPÁL INVESTIGATOR. GI= CTFER INVESTIGATOR) PI - UNKNOWN UNKNEWN

EXPERIMENT BRIEF DESCRIPTION

THE METEOPOLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (DESERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL. GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS: DATA FROM UP TO 10.000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA TO EXISTING SMALL GROUND-BASED APT RECEIVING STATIONS FROM A LARGER WEATHER CENTRAL FACILITY. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE WINIMUM DATA COLLECTION SYSTEM FOR ONE SMS WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVICUAL STATIONS WILL VARY FROM 50 TO 3000 BITS: DEPENDING ON THE TYPE AND VARIETY OF SENSURS USED AT AN INDIVIDUAL DCP STATION.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

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NESDC ID SMS-B SPACECRAFT COMMON NAME- SMS-B ALTERNATE NAMES- PL-731E, SYNCH MTEORGLOGGL SAT'E, SYNC MET SAT B

SPACECRAFT WEIGHT IN CREIT- 243. KG PLANNED LAUNCH DATE- 02/00/74

LAUNCH VEHICLE- DELTA

0.0 DEG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

FUNDING AGENCY UNITED STATES

NO AA-NESS

PLANNED ORBIT PARAMETERS

ORBIT PERICO- 1400. MIN GREAT TYPE- GEOCENTRIC

APDAPS IS - 35700 . KM ALT PERIAPS IS- 35700 . KM ALT

INCLINATION-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)

FORDYCE GREENBELT. MD NASA-GSFC PM - D.V.

NASA-GSEC SHENK PS - W.E.

GREENEELT. MC

### SPACECRAFT BRIEF DESCRIPTION

THE SMS-B WILL BE A NASA-DEVELOPED. NOAA-CPERATED SPACECRAFT. THE SPIN-STABILIZEC. EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO FROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METECROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTE EARTH-BASED PLATFORMS. AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON. ELECTRON. AND SCLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE FRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL AFERTURE IN THE SPACECRAFT'S SIDE. A SUFFERT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SGLAR PANELS, WHICH WILL FURN THE CUTER WALLS OF THE SPACECRAFT AND FROVIDE THE PRIMARY SCURCE OF ELECTRICAL POWER . LOCATED IN THE ANNULUS-SHAFED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND CEMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEMS. A LCW-POWER WHE TRANSPONDER WILL FREVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKLE FOR THE FRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 12/18/72. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME - ENERGETIC PARTICLE MCNITOR

NESCO ID SMS-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CT+EF INVESTIGATOR) NOAA-ERL PI - D.J. WILLIAMS

# EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLIC-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR FULSE AMPLIFICATION AND PULSE HEIGHT DISCRIMINATION. WILL BE USED TO DETAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE I TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEY, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NESDC ID SMS-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) PI - 0.J. WILLIAMS NOAA-ERL BOULDER. CO

#### EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IDNIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHUSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLIMATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH PANGE 0.5- TO 3-A.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSCC IC SMS-B -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: 01=CTHER INVESTIGATOR)
PI = 0.J. WILLIAMS NOAA-ERL BOULDER: CO

## EXPERIMENT BRIEF DESCRIPTION

A ELAXIAL, CLGSED-LOOP, FLUXGATE MACNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (AFFROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SFIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (+50, 100, 200, CR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (FLUS CR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAFABILITY.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - VISIELE-INFRARED SPIN-SCAN RACICMETER NSSCC IC SMS-B -04 (VISSR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI + NESS STAFF NOAA-NESS SLITLANC, MD

## EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADICMETER (VISSR) TO BE FLOWN ON SMS-B WILL BE CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUDCOVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS. SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OFFERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRON) WILL

USE A COMMON OPTICS SYSTEM. INCOMING RACIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPEC SCAN MIRROR AND COLLECTED BY A FITCHEY-CPRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NUMINAL ANGLE OF 45 DEG TO THE VISSR UPTICAL AXIS. WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS DRIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRRER NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH: WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO MADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES EETWEEN 160 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACGUISITION STATICA. WALLEPS ISLAND. VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER." WHERE IT WILL BE STURED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REEROACCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSE CATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE. NORTH CAROLINA. FOR ARCHIVING.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEORULOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NESDC ID SMS-B -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT ERIEF DESCRIPTION

THE METEOROLOGICAL BATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL CATA COLLECTED FROM RENOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL CATA UTILIZATION CENTERS. CATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA TO EXISTING SMALL GROUND-BASED AFT RECEIVING STATIONS FROM A LARGER WEATHER CENTRAL FACILITY. THIS COMMUNICATIONS SYSTEM WILL CORSIST DE APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF CATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS. DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS. DEFENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCF STATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

SPACECRAFT COMMON NAME- SMS-C

NSSCC ID SMS-C

ALTERNATE NAMES-

GUES-A

PLANNED LAUNCH DATE- 08/00/74

SPACECRAF1 WEIGHT IN CREIT-

LAUNCH SITE- CAPE KENNELY. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES

NOAA-NESS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERICE- 1436. MIN

APDAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT

INCLINATION-

0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.V. FORDYCE

NASA-GSFC

GREENEELT. MD

PS - W.E. SHENK NASA-GSFC

GREENEELT. MD

SPACECRAFT ERIEF DESCRIPTION

THE SMS-C/GEDS-A WILL BE A NASA-DE VELOPED. NCAA-CPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRAREC SPIN-SCAN RACIOMETER (VISSR) TO FROVICE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM. (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL AFT-EGUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LCCATED EARTH-BASED PLATFORMS. AND (3) A SPACE ENVIRONMENT MUNITOR (SEM) SYSTEM TO MEASURE PROTON. ELECTRON. AND SCLAF X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH. EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A FONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RACIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR FANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT. BATTERIES. AND MOST OF THE SEM EQUIFMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPREXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND CEMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND CURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM CNCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-C WILL BE CAPABLE OF PROVIDING CAY/NIGHT CBSERVATIONS OF CLOUDCOVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS.

SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OFERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRAREC CHANNEL (10.5 TG 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TC 0.75 MICRON) WILL USE A COMMON OFFICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSE OPTICAL AXIS. WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS URIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN. EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH. WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO MADIR ANGLE. A MERCURY-CARMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERC NADIR ANCLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RALIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROFUSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSE OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION. WALLOPS ISLAND. VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER." WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FUR REEROACCAST TO AFT USEP STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSE DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASSEVILLE. NORTH CAROLINA. FOR ARCHIVING.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPRILYED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NESCC IC SMS-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHEF INVESTIGATOR)
PI ~ D.J. WILLIAMS NGAA-EKL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILGRED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO DETAIN THE FULLUWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV. SIX CHANNELS WILL MEASURE ALFHA PARTICLES IN THE RANGE 4 TO 400 MEV. AND DNE CHANNEL WILL MEASURE FLECTRONS GREATER THAN 0.5 MEV.

ON 12/18/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSCC IC SMS-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=DTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BCULCER. CO

EXPERIMENT BRIEF CESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR. TWO IONIZATON CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR. WHICH WILL BE MOUNTED SO THAT THE

DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND CONNAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE DNCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT I ATMOSFHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A S-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE C.S- TO 3-A.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITUR

NSSCC IC SMS-C -04

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, DIECTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

A BLAXIAL, CLCSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SFIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE FANGE (+50. 100, 200, or \$00 gammas), an offset field capability (flus or winus 1200 gammas in \$0-gamma steps), and an inflight calibration capability.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NESCC IC SMS-C -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE METECROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA CULLECTION (DESERVATION) PLATFORMS (DCF). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL. GROUNG-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEUROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATICAS TO BE CONTACTED IN A 5-ER PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND ECCK BITS, DEFENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL COP STATILN.

ON 12/16/72, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME - SRATS ALTERNATE NAMES-

NSSDC ID SRATS

PLANNED LAUNCH DATE- 00/00/74

SPACECRAFT WEIGHT IN CREIT-

MIN

70. KG

LAUNCH SITE- KAGOSHIMA, JAPAN

LAUNCH VEHICLE- M-35-C

FUNDING AGENCY

JAPAN

TOKYO U

PLANNED ORBIT PARAMETERS

ORBIT PERICO-ORBIT TYPE- GEOCENTRIC

FERIAPSIS- 250 . KN ALT INCLINATION-2000. KM ALT APDAPSIS-

30 . DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST) TOKYO, JAPAN U OF TOKYO HIRAD PM - K.

SPACECRAFT BRIEF DESCRIPTION

SRATS (SOLAR RACIATION AND THERMOSPHERIC SATELLITE) WILL BE AN AERONOMY RESEARCH SATELLITE. IT WILL HAVE AN GCTAGCHAL COLUMN FORM (75 CM IN DIAM AND 65 CM IN HEIGHT). IN WHICH THE EXPERIMENT INSTRUMENTS WILL BE MOUNTED. THE SATELLITE WILL BE SPIN STABILIZED IN A ROLLING WHEEL MODE BY A GECMAGNETIC ATTITUDE CONTROL SYSTEM. FOLF PLASMA FROES CAN BE EXTENDED PERPENDICULAR TO THE SPIN AXIS BY 0.5-M METALLIC BOOMS. POWER AT AN AVERAGE RATE OF 15 W WILL BE PROVIDED BY 6000 SILICON N-P SULAR CELLS. THE OBJECTIVES OF THE SATELLITE WILL BE TO STUDY THE ICHOSPHERE SYSTEMATICALLY BY SIMULTANEOUSLY DESERVING SOLAR TONIZING RADIATIONS (HYDROGEN LYNAN-ALPHA AND X RAYS). THE ULTRAVIOLET ALBEDO OF THE EARTH, POSITIVE ION COMPOSITION, AND PLASMA PARAMETERS SUCH AS ELECTRON AND ION CENSITIES AND TEMPERATURES IN THE IONOSPHERE.

/ / . THE SPACECRAFT MISSION WAS ON

EXPERIMENT NAME- SOLAR X-RAY MUNITUR

NESDC ID SRATS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, QI=CTHER INVESTIGATOR) U OF TOKYO PI - M. MATSUCKA

EXPERIMENT BRIEF DESCRIPTION

CONTINUOUS MEASUREMENT OF THE TOTAL DISC INTENSITY OF SCLAR X RAYS WILL BE MADE WITH PROPORTIONAL COUNTERS.

/ / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- HYCROGEN LYMAN-ALPHA

NSSCC IC SRATS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CT+ER INVESTIGATOR) DSAKA . JAFAN OSAKA CITY U PI - T. OSHIC

EXPERIMENT BRIEF DESCRIPTION

CONTINUOUS MEASUREMENT OF HYDROGEN LYMAN-ALFHA EMISSION WILL BE MADE WITH A LIF-NO IGNIZATION CHAMBER.

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- GEOCORONAL ULTRAVIOLET GLOW

NSSEC IE SRATS -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - T. TOHMATSU U CF TCKYC TCKYC, JAPAN

EXPERIMENT BRIEF DESCRIPTION

OBSERVATIONS OF HYDROGEN, HELIUM, AND ATOMIC CXYGEN LINES WILL BE MADE WITH TWO IONIZATION CHAMBERS AND FOUR METALLIC THIN-FILM CHANNELTRON PHOTON COUNTERS.

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- ELECTRON DENSITY MEASUREMENT

NSSCC ID SRATS -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. OHYA KYCTC U KYCTC. JAPAN

EXPERIMENT BRIEF DESCRIPTION

CONTINUOUS MEASUREMENT OF LOCAL ELECTRON DENSITY WILL BE MADE BY MEANS OF AN IMPEDANCE PROBE.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- ELECTRON TEMPERATURE

NSSCC ID SEATS -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - K. FIRAO U OF TOKYO TOKYO, JAPAN

EXPERIMENT ERIEF DESCRIPTION

ELECTRON TEMPERATURE WILL BE DIRECTLY MEASURED WITH AN IMPROVED TYPE OF ELECTRON TEMPERATURE PROBE FOR STRUCTURAL STUDY OF THE IGNOSPHERE.

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- PLASMA DIAGNOSIS

NSSDC ID SRATS -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

A RETARDING POTENTIAL TRAP WILL BE USED FOR A MULTI-PURPOSE EXPERIMENT ON PLASMA DENSITY, TEMPERATURE, AND ICN COMPOSITION OF THE THERMOSPHERIC

PLASMA. LANGMUIF CURVES WILL BE TRANSMITTED THROUGH A 128-CHANNEL MAGNETIC-CORE MEMORY ANALYZER .

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME+ IONIC COMPOSITION

NESDC ID SRATS -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. CI=CTFEF INVESTIGATOR) RRL FUGONO

EXPERIMENT BRIEF DESCRIPTION A SENNETT TYPE ION-MASS SPECTROMETER WILL BE USED FOR CONTINUOUS MONITORING OF +++ FE++ AND O+ DENSITIES IN THE TOPSIDE ICNOSPHERE+

ON / / . THE SPACECRAFT MISSIEN WAS

EXPERIMENT NAME- EARTH ULTRAVIOLET ALBEDO

NESCO IC SRATS -08

EXPERIMENT PERSINNEL (PI=PRINCIPAL INVESTIGATOR. CI=C1FER INVESTIGATOR) TOKYO . JAPAN U OF TUKYO TIDHMATSU PI - T.

EXPERIMENT BRIEF CESCRIFTION

TWO FILTER PHOTOMETERS WILL MONITOR THE OZONE CONTENT IN THE MESOSPHERE AND UPPER STRATOSPHERE THROUGH MEASUREMENTS OF THE INTENSITY OF ULTRAVIOLET ALBEDOS AT 2500 AND 2900 A AND THEIR ANGULAR DISTRIBUTIONS.

ON / / " THE SPACECRAFT MISSION WAS

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NSSEC IE SRE-11A SPACECRAFT COMMON NAME- SOLRAD 11A SRD-11A, SOLRAD HI-TRIP, SESF NC.NEL-111-0264, NEL-111 ALTERNATE NAMES-

PLANNED LAUNCH DATE- 03/00/75 SPACECRAFT WEIGHT IN DRBIT- 102.15 KG

LAUNCH VEHICLE- TITAN 3C LAUNCH SITE- CAPE KENNELY, UNITED STATES

FUNDING AGENCY DO D-NAVY UNITED STATES

PLANNED ORBIT PARAMETERS ORBIT TYPE- GEOCENTRIC OREIT PERICO- 3140. NIN APUAPSIS- 127622. KM ALT PERIAPSIS- 127622. KM ALT INCLINATION-0 。 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=FRCJECT SCIENTIST) WASHINGTON, DC NAVAL RESEARCH LAB PM - E.W. PETERK IN WASHINGTON, DC NAVAL RESEARCH LAB KREPL IN PS - R.W.

SPACECRAFT ERIEF DESCRIPTION

SOURAD 114 WILL BE ONE OF A PAIR OF IDENTICAL SATELLITES THAT WILL BE PLACED IN A CIRCULAR EQUATORIAL ORBIT OF 20 EARTH RADII. THE SATELLITES. WHICH WILL BE ORIENTED TOWARDS THE SUN, WILL PROVIDE 100 PERCENT REAL-TIME. CONTINUOUS MONITORING OF SOLAR X-RAY, UV. AND ENERGETIC FARTICLE EMISSIONS. EXPERIMENTS WILL INCLUDE EROAC-BAND ION CHAMBERS CESERVING SCLAR X-RAYS BETWEEN 0.1 AND 60 A. PROPORTIONAL COUNTERS AND SCINTILLATORS OBSERVING SCLAR X-RAYS EETWEEN 2 AND 15C KEV. AN ELV DETECTOR COVERING THREE BANDS BETWEEN 170 AND 100G A. A VARIABLE RESOLUTION EBEFT-FASTIE SPECTROMETER COVERING THE WAVELENGTH RANGE OF 1100 TO 1600 A (RESOLUTION - 1 TO 25 A). A SOLAR WIND MONITOR, SOLAR PROTON, ELECTRON, AND ALFHA FARTICLE MONITORS, TWO X-RAY POLARIMETERS (ONE UTILIZING BRAGG SCATTERING AND THE CITHER UTILIZING THOMPSON SCATTERING). A BRAGG SPECTROMETER OBSERVING MAGNESIUM-11 AND -12 LINES, A LARGE-AREA AURORAL X-RAY DETECTOR. AND A FASSIVELY COOLED SCLIC STATE X-RAY DETECTOR TO MEASURE BACKGROUND X-RAY EMISSIONS.

ON 00/00/71. THE SPACECRAFT MISSICN WAS APPROVED.

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SPACECRAFT COMMON NAME- SOLRAD 118 NSSDC ID SRD-118
ALTERNATE NAMES- SOLRAD HI-TRIP, NRL-111, FL-723F, SESP NO.NRL-111-0254, SOLRAD

PLANNED LAUNCH CATE- C3/0C/75 SPACECRAFT WEIGHT IN CREIT- 102-15 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY

UNITED STATES DOD-NAVY

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC - ORBIT PERIOC- 3140. MIN

APOAPSIS- 127622. KM ALT PERIAPSIS- 127622. KM ALT INCLINATION- 0. DE

SPACECRAFT PERSONNEL (PM=PRCJECT MANAGER. FS=PRCJECT SCIENTIST)

PM - E.W. PETERKIN NAVAL RESEARCH LAB WASHINGTON, DC
PS - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON. DC

## SPACECRAFT BRIEF DESCRIPTION

SOLRAD 11E WILL BE ONE OF A PAIR OF IDENTICAL SATELLITES THAT WILL BE PLACED IN A CIRCULAR EQUATORIAL ORBIT OF 20 EARTH RADII. THE SATELLITES, WHICH WILL BE ORIENTED TOWARDS THE SUN, WILL PROVIDE 100 PERCENT REAL-TIME, CONTINUOUS MONITORING OF SOLAR X-RAY, LV. AND ENERGETIC FARTICLE EMISSIONS. EXPERIMENTS WILL INCLUDE ERDACHAND IGN CHAMBERS OBSERVING SCLAR X-RAYS BETWEEN 0.1 AND 60 A, PROPORTIONAL COUNTERS AND SCINTILLATORS OBSERVING SOLAR X-RAYS BETWEEN 2 AND 150 KEV. AN ELV DETECTOR COVERING THREE BANDS BETWEEN 170 AND 1000 A. A VARIABLE RESOLUTION BERT-FASTIE SPECTROMETER COVERING THE WAVELENGTH RANGE OF 1100 TO 1600 A (RESOLUTION - 1 TO 25 A). A SOLAR WIND MONITOR, SOLAR PROTON, ELECTRON, AND ALFHA FARTICLE NONITORS, TWO X-RAY POLARIMETERS (ONE UTILIZING BRAGG SCATTERING AND THE OTHER UTILIZING THOMPSON SCATTERING). A BRAGG SPECTROMETER OBSERVING MAGNESIUM-11 AND -12 LINES. A LARGE-AREA AURGRAL X-RAY DETECTOR, AND A FASSIVELY COOLED SCLIC STATE X-RAY DETECTOR TO MEASURE BACKGROUND X-RAY EMISSIONS.

ON 00/00/71. THE SPACECRAFT MISSIGN WAS APPROVED.

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SPACECRAFT COMMON NAME- TIROS-N ALTERNATE NAMES-

NSSDC ID TIROS-N

PLANNED LAUNCH DATE- 10/00/76

SPACECRAFT WEIGHT IN ORBIT-

LAUNCH SITE- VANCENEERG AFP. UNITED STATES

LAUNCH VEHICLE- DELTA

FUNDING AGENCY UNITED STATES

NGAA-NESS

PLANNED ORBIT PARAMETERS

GRBIT TYPE- GEOCENTRIC APDAPSIS- 1678.00 KM ALT PERTAPSIS- 1676.00 KM ALT INCLINATION-

ORBIT PERICO- 120. WIN

103. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, FS=FROJECT SCIENTIST)

STAMPFL PM - K.A.

PS - ₩°

NASA-GSFC

GREENBELT. MD

GREENBELT . MD NASA-GSFC

# SPACECRAFT ERIEF DESCRIPTION

SHENK

TIROS-N WILL BE THE PROTOTYPE FOR THE THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEORCHOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE SUN-SYNCHRONOUS PLATFORM FOR TESTING ADVANCED OFERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESCLUTION RADIOMETER (AVER) FOR DESERVING DAYTIME AND NIGHTTIME GLOBAL CLEUCCOVER AND A TIRDS CFERATIONAL VERTICAL SOUNCER (TOYS) FOR DETAINING TEMPERATURE AND WATER VAFOR PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL SE A SPACE ENVIRONMENT MONITOR (SEM). WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH. AND A DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METECROLOGICAL DATA RECEIVED FROM FREE-FLOATING EALLOGNS AND OCEAN BUCYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-PCINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEC IN ALL THREE AXES. WITH MCTICK RATES OF LESS THAN 0.036 DEG/SEC.

ON 01/00/72. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- ACVANCED VERY FIGH RESOLUTION RACIOMETER (AVERE)

NESCC ID TIRCS-N-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: CI=CTFEF INVESTIGATOR) SLITLAND. ND NO AA - NESS NESS STAFF

## EXPERIMENT BRIEF DESCRIFTION

THE TIROS-N ACVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES UN A REGULAD DAILY EASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECERDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTES -- CHANNEL 1. 0.4 TO 1.0 MICRON (VISIBLE), CHANNEL 2. 0.75 TO 1.00 MICRON (NEAF IR), CHANNEL 3, 10.5 TO 12.5 MICRONS (IR MINDOW) AND CHANNEL 4.

6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINCOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H. -I. AND -J.

ON 01/00/72. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIFOS CPERATIONAL VERTICAL SCUNDER (TOVS)

NESDC ID TIROS-N-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

OI - UNKNOWN METEOROLOGICAL OFFICE LONCON, ENGLAND

#### EXPERIMENT ERIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TCVS) TO BE FLOWN ON TIROS-N 15 DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR. AND DZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SCUNCING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLICKING SPECTFAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION: CHANNEL 2 - THE 9.6-MICRON OZONE BAND: CHANNEL 3 - THE 11-1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE EAND, AND THREE CHANNELS IN THE 18- TO 30-NICRCN RETATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS. USING SELECTIVE ABSORPTION BY PASSING THE INCOMING FADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DICKIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S OFFITAL MOTION WILL PROVIDE SCANNING IN THE GRTHDGONAL DIRECTION. THE DESIGN WILL ALLOW SCUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART. AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMELS 4. VERTICAL PROFILES OF TEMPERATURE, CZONE, AND WATER VAPOR CAN BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE STREACE TO 1 WE AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE WILL EXTEND FROM THE SURFACE TO THE TROPOPAUSE AND WILL BE ACCURATE TO 20 PERCENT, WHILE THE DZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS MAY EVENTUALLY INCLUDE TWO ACCITIONAL INSTRUMENTS - ONE TO MEASURE INTERVALS IN THE 4.3-MICHON CARBON DICKIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE 5.5-MM OXYGEN BANC. FRESENTLY, THESE TWO ADDITIONAL UNITS WILL NOT FLY ON TIROS-N BUT WILL BE ADDED TO SUBSEQUENT WISSIGNS (ITCS-+, -I, AND -J).

ON 01/00/72. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL COSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUDYS, CIHER SATELLITES, AND FIXED GREUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FREM THESE HANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND WILL BE RETRANSMITTED WHEN THE SPACECRAFT COMES IN RANGE OF A CUMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOOMS. THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE CESERVED TO CALCULATE THE LUCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE SYSTEM WILL BE BUILT WITH A REACOUT CAPABILITY OF 0.8 KHS AS WELL AS AN 8-KBS CAPABILITY FOR CATA TRANSMISSION TO A CDA STATION. THE DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMEUS-F.

ON 01/00/72. THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- UK E ALTERNATE NAMES-

ASSECTED UK-5

UNITED KINGDON 5, FL-732B

PLANNED LAUNCH DATE- 06/00/74

SPACECRAFT WEIGHT IN CREIT- 129. KG

LAUNCH SITE- SAN MARCO PLATFORM. OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

UNITED STATES

NA SA-DSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD-APUAPSIS- 450.000 KM ALT PERIAPSIS- 450.000 KM ALT INCLINATION- 37. DEG

MIN

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST) EAKER PM - HoLo

GREENBELT: MD NASA~GSFC

SPACECRAFT BRIEF DESCRIPTION

THE UK-S SPACECRAFT IS DESIGNED TO CARRY SIX EXPERIMENTS WHICH WILL MEASURE THE SPECTRUM, PCLARIZATION, AND PLESAR FEATURES OF NON-SOLAR X-RAY SOURCES. THE SPACECRAFT WILL BE SPIN STABILIZED. AND THE EXPERIMENTS WILL SCAN THE SKY PERPENDICULAR TO THE SPIN AXIS WHILE FOUR EXPERIMENTS WILL BE POINTED PARALLEL TO THE SPIN AXIS. DATA WILL BE STORED ON EDARD THE SPACECRAFT IN A CORE STORAGE AND DUMPED TO GROUND STATIONS CACE FER CREIT.

ON 09/00/70, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- 0.3- TO 30-KEV COSMIC X-RAY WITH A NSSDC ID UK-5 ROTATION CCLLIMATOR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.F. BOYD U COLLEGE, LONDON LONDON, ENGLAND

OI - P.A. WILLMCRE U COLLEGE, LONDON LONDON, ENGLAND

OI - P.W. SANFORD U COLLEGE, LONDON LONDON, ENGLAND

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL COMBINE THE FUNCTION OF OBSERVING X-RAYS IN DIFFERENT ENERGY RANGES WITH THAT OF STAR TRACKING. THE EXPERIMENT WILL CONTAIN A ROTATION COLLIMATOR. UTILIZING THE SATELLITE SPIN, BEHIND WHICH THERE WILL BE THREE DETECTORS. THE FIELD OF VIEW WILL BE A CONE WITH A SEMI-ANGLE OF 10 DEG TO 20 DEG. DEPENDING ON THE TYPE OF RADIATION VIEWED BY THE DIFFERENT DETECTORS. THE FIRST DETECTOR WILL BE A VISIBLE LIGHT PHOTOMULTIPLIER WHICH WILL ENABLE THE SPIN AXIS TO BE ACCURATELY DETERMINED BY VIEWING THE BACKGROUND OF OPTICAL STARS. SECONDLY, THERE WILL BE AN ARRAY OF CHANNEL ELECTRON MULTIPLIERS. WITH SELECTABLE FILTERS. COVERING THE WAVELENGTH PANGE 0.3 TO 6 KEV. THIRO, THERE WILL BE A GROUP OF FROPORTIONAL COUNTERS COVERING THE RANGE 2.5 TO 30 KEV. IT IS BELIEVED THAT SOURCE POSITIONS CAN BE DETERMINED TO WITHIN 2 ARC-MIN FOR BRIGHT SOURCES.

ON 09/00/70. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- 2- TO 10-KEV SKY SURVEY

NSSCC IC UK-5 -02

EXPERIMENT PERSONNEL (PI = PRINCIPAL INVESTIGATOR, DI = (THEF INVESTIGATOR) U OF LEICESTER LEICESTER. ENGLAND PI - K.A. POUNDS U OF LEICESTER LEICESTER. ENGLAND Q1 - B.A. COOKE U OF LEICESTER LEICESTER, ENGLAND 01 - D.J. ADAMS GRIFFITES U OF LEICESTER LEICESTER. ENGLAND 01 - R.

## EXPERIMENT BRIEF CESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A LARGE-AREA FROFORTICNAL COUNTER ARRANGED TO VIEW IN A DIRECTION PERPENDICULAR TO THE SATELLITE SPIN AXIS. THE SATELLITE ROTATION, THEREFORE, WILL ALLOW A SCAN OF A 360-DEG BAND OF THE SKY. IF THE SATELLITE SPIN AXIS IS ARRANGED TO FOINT AT A GALACTIC POLE. THE WHOLE OF THE MILKY WAY MAY BE SCANNED AT DICE. THE EXPERIMENT WILL COVER THE PHOTON ENERGY RANGE 1.5 TO 20 KEV AND WILL EFFECT A HIGH-SENSITIVITY SURVEY. DETAINING SCURCE LOCATIONS: INTENSITY: AND SPECTRA: A NUMBER OF DIFFERENT MODES OF OPERATION WILL BE USED IN WHICH THE AVAILABLE STORAGE SPACE IN THE CORE STORE CAN OBTAIN SPATIAL INFORMATION AT THE EXPENSE OF SPECTRAL RESOLUTION OR CONVERSELY. THE SENSITIVITY OF THE EXPERIMENT WILL ALLOW THE DETECTION OF SOURCES OF THE ORDER OF 10 TO THE MINUS FOUR TIMES THE INTENSITY OF SCG XR-1. WITHIN THE TIME OF ABOUT CHE DAY. THE ABILITY OF THE SURVEY INSTRUMENTS TO DETERMINE THE POSITIONS OF SOURCE WILL DEPEND ON THE STRENGTH OF THE SOURCE AND THE NUMBER OF OTHER SOURCES IN A GIVEN PART OF THE SKY. A SCURCE OF 5 X 10 TO THE MINUS THREE TIMES THE STRENGTH OF SCO XR-1 CAN BE LOCATED WITH A PRECISION OF ABOUT 15 AFC-MIN.

ON 09/00/70. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- FIGH-RESOLUTION SOURCE SPECTRA

NSSDC ID UK-5 -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CTHER INVESTIGATOR)
PI - R.L.F. BOYD
U COLLEGE, LONDON LONDON, ENGLAND

OI - P.A. WILLMORE U COLLEGE. LONDON
OI - P.W. SANFORD U COLLEGE. LONDON

LONDON: ENGLAND

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A HIGH-RESCLUTION PROPORTIONAL COUNTER SPECTROMETER WITH A 128-CHANNEL PULSE HEIGHT ANAL YZER . AND WILL RESPOND TO PHOTONS IN THE 2 TO 30 KEY ENERGY RANGE. THE SPECTRA OF SOURCES WILL THEREFORE BE EXAMINED IN GREATER DETAIL THAN HAS BEEN FREVIOUSLY POSSIBLE. LINE EMISSION FOR CERTAIN ELEMENTS (E.G. IRON) MAY ALSO BE IDENTIFIED. THE DETECTOR WILL VIEW IN A DIRECTION PARALLEL TO THE SPIN AXIS AND. THEREFORE. WILL CONTINUE TO OBSERVE THE SAME PIECE OF SKY FOF AS LONG AS THE POSITION OF THE SATELLITE SPIN AXIS REMAINS UNALTERED. THE EXPERIMENT AXIS WILL POINT APPROXIMATELY TWO CEG OFF THE SPIN AXIS. SC. WHEN COSERVING A SCURCE ALSO TWO DEG OFF THE SPIN AXIS. THE SOURCE WILL PASS IN AND OUT OF THE FIELD OF VIEW DURING EACH ROTATION. THIS WILL PERMIT THE BACKGROUND FLUX TO BE SAMPLED EVERY SPIN PERICE, BY RECORDING THE SPECTRAL INFORMATION IN FOUR SETS OF LOCATIONS. EACH CORRESPONDING TO A QUADRANT OF THE SPIN CYCLE. THIS WILL OVERCOME THE LACK OF INFORMATION ON FOSSIBLE FLUCTUATIONS IN THE BACKGROUND FLUX CURING AN ORBITS INTEGRATION. THE EXPERIMENT CAN ALSO BE OPERATED IN A MODE IN WHICH PERIODICITIES IN THE RANGE TYPICAL OF PULSAR FREQUENCIES WILL BE DETECTED.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- POLARIMETER/SPECTROMETER

NSSCC IC UK-5 -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) U OF LEICESTER LEICESTER. ENGLAND PI - K.A. POUNDS OI - B.A. U OF LEICESTER COOKE LEICESTER . ENGLAND 01 - D.J. ADAMS U OF LEICESTER LEICESTER. ENGLAND U CF LEICESTER LEICESTER. ENGLAND GRIFFITES CI - R.

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE A POLARIMETER/SPECTROMETER OPERATING IN THE 2-TO 8-KEV RANCE. IT WILL USE TWO LARGE PLANE CRYSTALS, LITHIUM HYDRIDE AND GRAPHITE, IN A ERAGG SPECTROMETER WITH A HONEYCOME COLLIMATOR. IT WILL BE MOUNTED TO VIEW ALONG THE SATELLITE SPIN AXIS AND EXAMINE THE RACIATION OF INDIVIDUAL X-RAY SOURCES FOR POSSIBLE POLARIZATION AND/OR THE EXISTENCE OF LINE EMISSIONS. IN A SOURCE OF THE BRIGHTNESS OF THE CRAB NEBULA. A POLARIZATION OF 2-5 PERCENT CAN BE DETECTED. THE EXFERIMENT WILL ALSO CONDUCT SEARCHES FOR PULSAR ACTIVITY. THE NATURE OF THE EXFERIMENT WILL MAKE IT POSSIBLE TO EXAMINE THE POLARIZATION OF THE PULSAR ITSELF BY LOCKING FOR DIFFERENT PULSAR BEHAVIOR IN THE SEPARATE POLARIZATION COMPONENTS.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - HIGH-ENERGY COSMIC X-RAY SPECTRA NSSCC 1D UK-5 -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)

PI - H. ELLIOTT IMPERIAL COLLEGE LONDON, ENGLAND

OI - J.J. GUENEY IMPERIAL COLLEGE LONDON, ENGLAND

OI - A.R. ENGEL IMPERIAL COLLEGE LONDON, ENGLAND

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO EXTEND THE SPECTFAL INFORMATION ON SELECTED X-RAY SOURCES IN THE ENERGY REGION ABOVE 20 KEV. MEASUREMENTS WILL BE POSSIBLE UP TO 2 MEV. ALTHOUGH THE EFFICIENCY OF THE DETECTOR FALLS STEEPLY AT THIS ENERGY. THE DETECTOR AXIS WILL BE INCLINED A FEW DEG WITH RESPECT TO THE SATELLITE SPIN AXIS SO THAT IT CONES AS THE SATELLITE SPINS. THE COUNTING RATE RESULTING FROM A POINT SCURCE A FEW DEG FROM THE SPIN AXIS WILL THUS BE MODULATED WITH THE SPIN PERIOD. THIS MODULATION WILL BE DETECTED BY DIVIDING THE SPIN CYCLE INTO FOUR SECTORS AND ANALYZING THE DIFFERENT COUNTING RATES IN EACH. IN THIS MAY, THE SCURCE INTENSITY CAN BE DETERMINED FROM THE AMPLITUDE OF THE MODULATION. FOR PULSAR OBSERVATIONS, A LARGE ENERGY WINDOW AT THE LOWER END OF THE DETECTOR RANGE WILL BE USED. THE OBSERVATIONS IN THIS ENERGY REGION WILL BE ANALYZED FOR A FULSAR PERIODICITY IN A SPECIAL SYSTEM WHICH WILL BE PART OF THE SPACECRAFT DATA HANDLING ELECTRONICS.

ON 09/00/70, THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- ALL-SKY MONITOR

NSSDC ID UK-5

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

P1 - S.S. GI - E.A. BOLOT

NASA-GSFC

NASA-GSFC GREENBELT + MD GREENBELT. MD

OI - P.J. SERLEMITSOS

NASA-GSFC

GREENBELT. MD

EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL SCAN THE X-RAY EMISSICA FROM THE ENTIRE CELESTIAL SPHERE AT ALL TIMES. THEREBY COVERING THE LARGE AREAS THAT LIE OUTSIDE THE FIELD OF VIEW OF OTHER CN-BOARD EXPERIMENTS. IT WILL BE A VALUABLE AID IN PROGRAMMING SATELLITE MANEUVERS SC THAT TRANSIENT EVENTS IN THE X-RAY SKY. SUCH AS NEARBY NOVAE AND X-RAY FLARES, MAY BE RAFIDLY MADE AVAILABLE FOR STUDY. WITH GREATER RESCLUTION BY THE CTHER EXPERIMENTS.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMUN NAME- VIKING-A ALTERNATE NAMES-PL-733A

NSSDC ID VIKNG-A

PLANNED LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT IN DREIT-

3216. KG

LAUNCH SITE- CAPE KENNECY, UNITED STATES

LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY

UNITED STATES

NASA-OSSA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- MARSCENTRIC

ORBIT PERIOD- 1476. NIN

20. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.J. MARTIN PS - G.A. SOFFEN NASA-LARC

HAMPTON: VA

## SPACECRAFT EPIEF DESCRIPTION

THE VIKING SPACECRAFT WILL CONSIST OF AN ORBITER AND A LANDER. THE ORBITER WILL BE CAPABLE OF DRBITING THE PLANET MARS IN A HIGH-ECCENTRICITY ELLIPTICAL ORBIT. A LANCER WILL SEPARATE FFOM THE CREITER. ENTER THE MARTIAN ATMOSPHERE. AND SOFT-LAND ON THE SURFACE. DRBITAL. ENTRY, AND SCIENTIFIC DATA FROM THE LANDER WILL BE COLLECTED AND TRANSMITTED TO EARTH. THE SPACECRAFT WILL BE A SPIN-STABILIZED. SCLAR-CELL-FOWERED SATELLITE. EGTH THE ORBITER AND LANCER WILL HAVE A SO-DAY LIFE EXPECTANCY. THERE WILL BE A 500-W POWER CAPACITY FOR THE ORBITER AND A 70-W CAPACITY FOR THE LANDER. SCIENTIFIC AND FFOTOGRAPHIC ANALYSIS INSTRUMENTS WILL WEIGH APPROXIMATELY 125 LB FOR THE CRBITER AND 70 LB FOR THE LANDER.

ON 12/00/69. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- IMAGERY ORBITER

NSSCC IC VIKNG-A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR) US GEOLOGICAL SURVEY MENLO PARK. CA CARR PI - M. LOWELL COSEFVATORY FLAGSTAFF & AZ 01 - W.A. RAUM FLAGSTAFF, AZ US GEOLOGICAL SURVEY MASURSKY 01 - H. AMHERST. MA U OF MASSACHUSETTS WISE 01 - D.U. U CF ADELAIDE ACELAICE, AUSTRALIA DI - B.H. ERIGES

## EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THE VIKING ORBITER TV IMAGING EXPERIMENT INVESTIGATION WILL BE TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FUTURE MISSIONS, TO MONITOR THE REGION SURROUNDING THE LANDER. AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE GEOMETRIC RESCLUTION OF THE ORBITER IMAGING SYSTEM WILL BE 30 M PER LINE OR BETTER AT A REFERENCE ALTITUDE OF 1000 KM. WITH IMAGE SMEARING FROM CREITER MOTION TO BE LESS THAN 50 PERCENT OF THIS RESOLUTION. PRIOR TO LANDER SEPARATION. THE CREITER WILL BE REQUIRED TO PHOTOGRAPH WITH CONTIGUOUS PICTURES A SWATH AT LEAST 40-KM CROSS-TRACK BY 500-KM DOWN-TRACK ON A SINGLE CREITAL PASS FROM THE NEAR-PERIAPSIS PERTION OF THE ORBIT. THE NEAR-PERIAPSIS COVERAGE REQUIREMENT AFTER LANCER SEPARATION WILL OBTAIN COMPLETE COVERAGE WITH CONTIGUOUS PICTURES OF AN AREA AT LEAST 50 KM IN RADIUS CENTERED ON THE LANDER. TO CETAIN BOTH BROAD AREA AND HIGH RESOLUTION COVERAGE, IT WILL BE REQUIRED THAT IMAGERY BE CETAINABLE FROM THE PERIAPS IS AND APOAPSIS REGIONS OF THE ORBIT USING THE SAME IMAGING SYSTEM. THE DYNAMIC RANGE WILL BE 100 TO 1. AND THE SENSITIVITY WILL BE SUFFICIENT TO CETAIN PICTURES AS CLOSE TO THE TERMINATOR AS PRACTICAL USING THREE COLOR FILTERS.

CN 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IN FACIOMETRY -- THERMAL MAPPING

.NSSCC ID VIKNG-A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. DI=OTHER INVESTIGATOR) LOS ANGELES, CA U OF CALIFORNIA. LA PI - H.H. KIEFFER FASADENI. CA CAL TECH OI - G. MUNCE PASADENA . CA NASA-JPL 01 - E.D. MINER 01 - G. NEUGEBAUER CAL TECH PASADENA, CA

#### EXPERIMENT BRIEF DESCRIPTION

THE DEJECTIVES OF THE INFRARED RACICMETRY EXPERIMENT WILL BE TO CETAIN SURFACE TEMPERATURE DATA OF MARS TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANCERS AND FOR FUTURE MISSIONS. TO MONITOR THE REGIONS SURROUNDING THE LANCER. AND TO STUDY THE CYNAMIC CHARACTERISTICS OF MARS. THE INFRARED RACIOMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. THE INFRARED RADIOMETER WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE TEMPERATURE RESOLUTION WILL BE AT LEAST PLUS OR MINUS INDEX AT 200 DEG K. AND THE MEASUREMENT RANGE WILL BE 180 TO 300 DEG K. AT A REFERENCE ALTITUDE OF 1000 KM. THE SPATIAL RESOLUTION WILL BE 10 KM SQUARED OR BETTER AFTER THE LANDER HAS SEPARATED FROM THE OFBITER.

ON 12/00/69, THE SPACECRAFT MISSICH WAS APPRICATED.

EXPERIMENT NAME- IR SPECTROMETER -- WATER VAPOR MAPPING NSSDC ID VIKNG-A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: CI≂OTHER INVESTIGATOR)

PI - C.B. FARMER OI - D. LAPORTE NASA-JPL NASA-JPL PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE IR SPECTROMETRY EXPERIMENT WILL BE TO DETERMINE THE HORIZONTAL DISTRIBUTION OF WATER VAPOR TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS. TO MONITOR THE REGION SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED SPECTROMETER WILL BE BORE SIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE WATER VAPOR MEASUREMENT RANGE WILL BE 0.05 TO 1.0 MM FRECIPITABLE WATER WITH A RESOLUTION OF AT LEAST 0.01 MM AT 0.2 MM. THE SPATIAL RESOLUTION WILL BE 20 KM SO OR LESS AFTER LANDER SEPARATION.

CN 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION ...

NESDC ID VIKNG-A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)

PI - A.G.C. NIER

DI - N.W. SPENCER

DI - M.B. MCELROY

01 - W.B.

U OF MINNESOTA NASA-GSFC KITT PEAK NATL OBS U OF TEXAS

GREENEELT. ND TUSCON. AZ DALLAS. TX

OI - A. SEIFF NASA-ARC

MUFFETT FIELD. CA

MINNEAPOLIS. MN

#### EXPERIMENT BRIEF DESCRIPTION

HANSON

THE VIKING ENTRY ATMOSPHERIC COMPOSITION EXFERIMENT IS CESIGNED TO PROVIDE THE COMPOSITION CATA (FOR BOTH NEUTRAL AND CHARGED SPECIES) NEEDED TO DEFINE THE PRESENT PHYSICAL AND CHEMICAL STATE OF THE MARTIAN ATMOSPHERE. A DOUBLE-FOCUSING (ELECTROSTATIC AND MAGNETIC) MASS SPECTROMETER. MOUNTED IN AN OPENING IN THE AEROSHELL WITH ITS ELECTRON IMPACT CPEN ICN SCURCE RECESSED BELOW THE SURFACE OF THE AEROSHELL. WILL BE USED TO MEASURE THE CONCENTRATIONS OF THE ATMOSPHERIC SPECIES THAT HAVE MASS-TO-CHARGE RATIOS FROM 1 TO 49. IT IS PLANNED THAT THE EXPERIMENT WILL CETAIN ACCURATE ALTITUDE PROFILES OF ALL SPECIES. AND IN FARTICULAR FOR BOTH ATCMIC AND MOLECULAR OXYGEN, CARBON MONOXIDE. AND CARBON DIOXIDE. TWO COLLECTORS WILL

BE USED -- ONE COVERING THE MASS RANGE FROM 1 TO 7 AMU AND THE OTHER SIMULTANEOUSLY COVERING THE RANGE FROM 7 TO 49 AMU. MASS SPECTRA WILL BE OBTAINED BY SWEEPING THE ION ACCELERATION VOLTAGE AND THE DEFLECTION VOLTAGE ACROSS THE ELECTROSTATIC PLATES. THE SWEEF PERICO WILL BE APPROXIMATELY 5 SEC. AND A DYNAMIC RANGE OF 10 TO THE 5 WILL BE FREVIDED WITHIN EACH SPECTRUM. AFTER CALIBRATION, THE INSTRUMENT WILL BE SEALED UNDER VACUUM AND OPENED WHEN THE LANCER IS RELEASED FROM THE GRBITER. CURING ENTRY, THE LANDER WILL BE TRAVELING WITH ITS AXIS CRIENTED ESSENTIALLY ALONG THE VELOCITY VECTOR SO THAT THE APPLIENT SPECIES WILL ENTER AT AN ANGLE NORMAL TO THE ENTRANCE PLANE. A RETARDING POTENTIAL ANALYZER (RPA) WILL MEASURE THE IONOSPHERIC PROPERTIES OVER APPROXIMATELY THE SAME ALTITUDE RANGE AS THE MASS SPECTROMETER. ITS FRONT END WILL MATE TO THE AEROSHELL SO THAT THE ENTRANCE GRID IS NEARLY FLUSH TO THE SURFACE, WHICH WILL EE MADE CONDUCTING IN THE REGION OF THE RPA TO PROVIDE A GROUND PLANE. THE SPACE BETWEEN THE ENTRANCE AND CULLECTOR WILL BE ELECTRICALLY SEGMENTED BY FIVE GRIDS WHOSE POTENTIALS DETERMINE THE ENERGY AND SIGN OF THE CHARGED PARTICLES THAT CAN REACH THE COLLECTOR. THE FIRST (ENTRANCE GRID). SECOND. AND LAST GRID WILL BE GROUNDED TO THE SPACECRAFT. THE THIRD AND FOURTH GRIDS TOGETHER WILL COMPRISE THE RETARDING GRID. AND THE FIFTH GRID. THE SUPRESSOR GRID. WILL BE HELD AT A FIXED POTENTIAL OPPOSITE IN SIGN TO THAT ON THE RETARDING GRID. THREE DIFFERENT LINEAR VOLTAGE RAMPS WILL BE APPLIED IN SUCCESSION TO THE RETARDING GRID. CHE RAMP WILL COVER THE VOLTAGE RANGE FRCM -75 TO O V (IN ABOUT 1 SEC). USED TO MEASURE SOLAR WIND ELECTRONS AND IONOSPHERIC PHOTOELECTRONS. ANOTHER WILL COVER FROM -3 TO 0 V (IN ABOUT CHE SEC). AND MEASURE ELECTRON TEMPERATURES IN THE LONGSPHERE. THE LAST RAND WILL COVER FROM +20 TO O V (IN ABOUT 2 SEC). AND PROVIDE ION TEMPERATURE AND ION CONCENTRATIONS CATA. WHEN THE LANDER IS ALIGNED WITH ITS AXIS ALONG THE VELOCITY VECTOR. THE LOW-ENERGY PLASMA WILL ENTER THE RPA AT AN ANGLE NEARLY NORMAL TO THE APERTURE GRID. EACH PARAMETER WILL BE EVALUATED APPROXIMATELY EVERY 4 KM IN ALTITUDE. A SHALL DISTANCE CEMPARED TO THE ANTICIFATED SCALE HEIGHTS. MORE EXPERIMENT DETAIL CAN BE FOUND IN PENTRY SCIENCE EXPERIMENT FOR VIKING 1975. BY A. O. C. NIER ET AL. ICARUS, VOL. 16, PP. 74, 1972.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC STRUCTURE

NEEDC ID VIKNG-A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) U OF MINNESCTA MINNEAPOLIS. MN PI - A.G.C. NIER TUSCON. AZ DALLAS, TX KITT PEAK NATE CBS OI - M.B. MCELROY U OF TEXAS HANSON GI - W. H. GREENEELT # MD C1 - N.₩. SPENCER NASA-GSFC MOFFETT FIELD. CA NA SA + ARC SETFF A - 10

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE PRESSURE, TEMPERATURE, AND DENSITY VARIATIONS WITH ALTITUDE IN THE LOWER MARTIAN ATMOSPHERE THROUGH MEASUREMENT OF ACCELERATION, PRESSURE, AND TEMPERATURE, THE ACCELERCMETER OF THE GUIDANCE AND CONTROL SYSTEM MAY BE USED FOR THE ATMOSPHERIC STRUCTURE INVESTIGATION.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BIOLOGY INVESTIGATION

NSSDC IC VIKNG-A-06

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	OI=OTHER INVESTIGATOR)
PI - H.P.	KLEIN	NA SA - AR C	MCFFETT FIELD, CA
01 - J.	LEDERBERG	STANFORC U	STANFORD. CA
01 - A.	RICH	MIT	CAMERIDGE. MA
01 - W.W.	VISHNIAC	U OF ROCHESTER	RCCHESTER. NY
.H.N - 10	HOROWITZ	NASA-JPL	FASADENA, CA
01 - V.I.	AMAYO	NASA-ARC	CHICAGO. IL
OI - G.V.	LEVIN	BIOSPHERICS INC	RCCKVILLE, MD

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE COMPOSED OF 4 PARTS. IT WILL MEASURE -- (1) THE PHOTOSYNTHETIC AND RESPIRATORY FIXATION OF CARBON DIOXIDE. (2) THE CARBON DIOXIDE RELEASED FROM PREVIOUSLY FIXED CARECH DICXIDE. (3) THE CARBON DIOXIDE RELEASED FROM ADDED LABELED ORGANIC COMPULNDS. AND (4) THE LIGHT SCATTERED FROM A LIQUID SAMPLE. AS A MEASURE OF THE INCREASE IN PARTICLES. IT WILL ATTEMPT TO DETERMINE THE PRESENCE OF LIFE ON MARS.

ON 12/00/69. THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- MOLECULAR ANALYSIS

NSSDC ID VIKNG-A-07

EXPERIMENT	PERS ONNEL	(FI=PRINCIPAL INVESTIGATOR. 01=0T	HER INVESTIGATOR)
PI - K.	BIEMANN	MIT	CAMBRIDGE: MA
OI - H.C.	UREY	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - D.M.	ANDERSON	CRREL	LA JOLLA: CA
01 - T.C.	DWEN	ILLINOIS INST OF TECH	CHICAGO: IL
CI - J.	ORO .	· U OF HOUSTON	HOUSTON. TX
01 - L.E.	ORGEL	SALK INST BIGL STUCIES	SAN DIEGO. CA
OI - G.P.	SHULMAN	NASA-JPL	PASADENA. CA

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS INVESTIGATION WILL BE TO ANALYZE THE MARTIAN SURFACE FOR ITS ERGANIC CONTENT BY VAPORIZING MATERIAL CATE A HIGH-EFFICIENCY CAS CHROMATOGRAPHIC COLUMN WHICH IN TURN WILL BE CONNECTED TO A FAST SCANNING (15 SEC) MASS SPECTROMETER. THE HEATING WILL BE ACCOMPLISHED IN STEPS TO VAPORIZE THOSE MATERIALS PRESENT WHICH HAVE SUFFICIENT VAPOR PRESSURE, AND ULTIMATELY TO DECOMPCEE FYRCLYTICALLY NONVOLATILE SUBSTANCES INTO VOLATILE DEGRADATION PRODUCTS FROM WHICH THE NATURE OF THE MATERIAL CAN THEN BE DEDUCED. IN ORDER TO ACCOMPLISH THE OBJECTIVES OF THIS INVESTIGATION CERTAIN PRIMARY REQUIREMENTS MUST BE MET. THE SENSITIVITY OF THE MASS SPECTROMETER SHOULD BE SUCH THAT A MASS SPECTRUM TAKEN OF A SINGLE DEGANIC COMPOUND WHICH IS ONE PART FEE HUNDRED WILLION (0.01 PPM) SHOWS PEAKS WHICH ARE 1 PERCENT OF THE BASE PEAK. THE MASS RANGE REQUIRED FOR ANALYSIS WILL BE AT LEAST 12-200 WITH UNITS RESOLUTION OR BETTER. THE RELATIVE DYNAMIC RANGE FOR EACH MASS SPECTRUM SHOULD BE 500 TO 1. A CONTROLLED TEMPERATURE WILL BE REQUIRED FOR VAPORIZATION PYRCLYSIS UP TO 500 DEG C IN TWO OR THREE PRESCRIBED STEPS OF 30 SEC. PROVISIONS HAVE TO BE MADE TO ENSURE THAT THE EVOLUTION OF LARGE QUANTITIES OF GAS (AS MUCH AS 5-10 PERCENT OF SAMPLE WEIGHT) COES NOT IMPAIR THE FUNCTION OF THE WASS SPECTROMETER. THIS MAY BE ACCOMPLISHED BY VENTING THE EXCESS GAS BEFORE IT REACHES THE MASS SPECTRUMETER. EIGHT DIFFERENT SAMPLES TAKEN AT SPECIFIED TIMES DURING THE FIRST 90 DAYS OF THE MISSION COVERING DIURNAL AND SEASONAL CHANGES WILL BE STUDIED. THE ORGANIC INVESTIGATION WILL NOT BE INITIATED UNTIL AFTER THE CPERATION OF THE ATMOSPHERIC ANALYSES REQUIRED CURING THE FIRST THREE DAYS. A SEPARATE DETECTOR AT THE OUTPLT OF THE GAS CHROMATOGRAPH AND A CARRIER GAS SEPARATOR WILL BE FREVIDED. THE CETECTOR WILL FREVIDE AUDITIONAL CHROMATOGRAPHIC CATA THAT WILL BE HELPFUL IN INTERPRETING THE MASS SPECTRA.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOIL WATER

NESCC ID VIKNG-A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) BOEING SCI RSCH LABS SEATTLE. WA PI - R.W. SFORTFILL US GEOLOGICAL SURVEY MENTC LYLK. CV MODRE aLoH - 10 PASADENA, CA CAL TECH SCOTT 61 - R.F. REDONDO BEACH. CA. TRW SYSTEMS GROUP HUTTON 01 - R.E.

## EXPERIMENT ERIEF DESCRIPTION

THE PURPOSE OF THE SOIL WATER EXFERIMENT WILL BE TO DETERMINE THE AMDUNTS AND FORMS OF CCCURRENCE OF FREE AND BOUND WATER IN SOIL SAMPLES OBTAINED FROM TWO DEPTHS: 0-5 CM AND 5-10 CM. THREE SAMPLES WILL BE ANALYZED AND. IF POSSIBLE. ONE ANALYSIS WILL BE CONCUCTED JUST BEFORE AND ANOTHER AFTER THE WAVE OF DARKENING. THE METHOD OF DETERMINATION WILL BE SCANNING CALCRIMETRY FROM AMEIENT TEMPERATURE (AS LCW AS POSSIBLE) TO THE HIGHEST POSSIBLE TEMPERATURE (UP TO 750 DEG C) WITH DETERMINATION OF EFFLUENT WATER AS A REQUIREMENT. THE RATE OF TEMPERATURE SCAN SHOULD BE SLOW ENOUGH TO DISTINGUISH ENCOTHERMS IN A RATIO OF 1.7 IN THE FIRST 30 CEG CF SAMPLE TEMPERATURE RISE. THE SAMPLE WILL CONTAIN LESS THAN 1 FART FER 10 MILLION OF WATER RELEASED FROM THE LANDER. IF FROZEN WATER EXISTS IN THE SOIL. IT WILL BE MAINTAINED SOLID UNTIL INITIATION OF THE ANALYSIS.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FACSIMILE CAMERA

NSSEC ID VIKNG-A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) FREVICENCE, RI BRCWN L P1 - T.A. MUTCH I THACA . NY CORNELL U or - c. SAGAN ILLINOIS INST OF TECH CHICAGO, IL BINDER BI - A.B. US GEOLOGICAL SURVEY FLAGSTAFF. AZ 01 - E.C. MURRIS PASADENA . CA NASA-JPL 01 - A. YEUNG HAMPTON, VA NASA-LAPC 01 - F.O. HJ CK PALC ALTC. CA STANFORD L LEV INTHAL DI - E.C.

## EXPERIMENT ERIEF CESCRIPTION

THE PURPOSE OF THE TV IMAGING INVESTIGATION FROM THE LANDER WILL BE TO VISUALLY CHARACTERIZE THE LANCING SITE. PROVIDING DATA WITH BIOLEGICAL. GEOLOGICAL, AND METEOROLOGICAL RELEVANCE. TWO CAMERAS WITH A 0.04-DEG SCANNING RESOLUTION WILL BE REQUIRED. THE VERTICAL FIELD OF VIEW FOR EACH CAMERA WILL BE 20 DEG. WITH A CAPABILITY OF CHTAINING & COMPLETE 0-360-DEG HORIZONTAL PANGEAMA. VERTICAL POINTING BY COMMAND FOR ANGULAR COVERAGE FROM 40 DEG ABOVE TO 60 DEG BELOW THE HORIZONTAL PLANE CF THE LANDER IN 10-DEG INCREMENTS WILL BE REQUIRED. AZIMUTH POINTING BY COMMAND WILL BE IN 30-DEG INCREMENTS. THE CAMERAS WILL BE MOUNTED AT LEAST 1.5 M ABOVE THE MARTIAN SURFACE AND MUST BE CAPABLE OF VIEWING TWO FOOTPADS AND THE ENTIRE AREA ACCESSIBLE TO THE SURFACE SAMPLER. EACH CAMERA MUST BE CAPABLE OF CHTAINING VISUAL COLOR IMAGERY. PROVISION WILL BE MADE FOR POSSIBLE LATER MODIFICATION TO OPERATE IN THREE SPECTRAL BANDS. HORIZONTAL STERED WITH A MINIMUM BASE OF  ${f 1}$  M will be required.

ON 12/00/69, THE SPACECRAFT MISSICH WAS APPROVED.

#### EXPERIMENT NAME- METECROLOGY EXPERIMENT

NESDC ID VIKNG-A-10

EXPERT MENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	OI=OTHER INVESTIGATOR)
PI - S.L.	HESS	FLORIDA STATE U	TALLAHASSEE, FL
OI - C.B.	LEOVY	U OF WASHINGTON	SEATTLE: WA
01 - R.M.	HENRY	NASA-LARC	HAMPTON, VA
.t - 10	RYAN	w M □	GENEVA, SWITZERLAND
OI - V.P.	KUETTNER	NOAA	BUULDER, CO

#### .. EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE METEOROLOGICAL ENVIRONMENT NEAR THE PLANETARY SURFACE AND OBTAIN INFORMATION ABOUT MOTION SYSTEMS OF VARIOUS SCALES. THE ELEMENTS TO BE DETERMINED ARE PRESSURE. TEMPERATURE, WIND VELOCITY. AND WATER VAPOR CONTENT OF THE MARTIAN ATMOSPHERE. DIURNAL AND TEMPURAL VARIATIONS OF THE FARAMETERS WILL BE OF FARTICULAR IMPORTANCE. PRESSURE, TEMPERATURE, AND WIND VELOCITY ARE TO BE MEASURED AT LEAST EVERY TWO MIN. WATER VAPOR IS TO BE MEASURED AT LEAST EVERY TWO HR. ALL MEASUREMENTS ARE TO BE CONTINUED FOR THE LANCER LIFETIME. THE SENSORS MAY BE MOUNTED ON STRUCTURES ALREADY AVAILABLE. SUCH AS FOOTPADS, ANTENNA MASTS, IMAGERY MASTS. OF THE SAMPLER ARM.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

#### EXPERIMENT NAME- SEISMOLDGY

NSSEC IE VIKNG-A-11

E XPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR,	OI = OTHER INVESTIGATOR)
PI - C.L.	ANDERSON	CAL TECH	PASADENA, CA
01 - R.F.	PRESS	MIT	CAMERIDGE. MA
G1 - M.N.	TOKSOZ	MIT	BOSTON. MA
01 - G.	SUTTON	L OF HAWAII	HCNOLULU. HI
01 - R.L.	KOVACH	STANFORD U	FALO ALTO, CA
OI - G.V.	LATHAM	U OF TEXAS	GAL VESTON, TX

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SEISMOMETRY INVESTIGATION WILL DETERMINE THE SEISMIC BACKGROUND AND EVENT ACTIVITY OF MARS. THREE PERFENDICULAR COMPONENTS OF GROUND MOTION WILL BE MEASURED OVER AS BROAD A FREQUENCY RANGE AS PRACTICAL (MAXIMUM EMPHASIS OVER THE EAND 0.05 TO 10 HZ). THE RESCLUTION WILL BE 50 MILLIMICRONS OR LESS OF GROUND DISPLACEMENT AT 1 HZ. WITH AN ACCURACY SUCH THAT TRUE GROUND MOTION AMPLITUDE CAN BE RECOVERED TO PLUS OR MINUS 10 PERCENT OR BETTER. DYNAMIC RANGE MAY BE INCREASED BY NARROW BAND FILTERING OF THE SEISMIC DATA AT THREE FREQUENCIES. THE SEISMOMETER CAN BE MOUNTED EITHER IN THE EQUIPMENT AREA OF THE LANDER, ON A FOOTPAD. OR REMOTELY DEPLOYED. REMOTE DEPLOYMENT WILL BE THE FREFERRED MODE. THE ORIENTATION OF THE SENSOR WILL BE KNOWN TO WITHIN 5 DEG IN BOTH AZIMUTH AND ELEVATION. IF THE SENSOR IS ATTACHED TO THE LANDER, TRANSMISSIBILITY OF THE LANDER SHOULD BE NO UND MPED RESONANCES LESS THAN APPROXIMATELY 10 HZ.

ON 12/00/69. THE SFACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY

NSSDC ID VIKNG-A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, GI=CT+ER INVESTIGATOR)
PI - C.A. BARTH U OF COLORADO BOULDER, CO

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, TO BE MOUNTED ON THE LANDER VEHICLE, IS DESIGNED TO MEASURE THE AMOUNT OF 2500-A AND 3400-A LV RACIATION THAT REACHES THE MARTIAN SURFACE TO DETERMINE WHETHER ATMOSPHERIC FILTERING IS DUE TO A MOLECULAR ABSORBER OR PARTICLE SCATTERING, THE DETECTOR WILL BE A TWO-CHANNEL UV PHOTOMETER WITH 100-A BANDWIDTH FILTERS FOR ECTH CHANNELS, AND A FIELD OF VIEW OF 10 DEG BY 10 DEG. THE DETECTOR WILL POINT WITHIN 30 DEG OF THE LANDER VEHICLE, BOTH CHANNELS WILL BE SAMPLED EVERY 8 MIN.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC PROPERTIES

ASSCC IC VIKNG-A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - R.B. HARGRAVES PRINCETON U PRINCETON, NJ

## EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT, WHICH WILL BE PART OF THE LANDER SECTION EXPERIMENTS. WILL MEASURE THE MAGNETIC PROPERTIES OF THE SURFACE PARTICLES ON MARS USING THREE MAGNETS FOR SAMFLING.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - RADIO CUMMUNICATION AND RADAR LANDING - NESCC IC VIKNG-A-14
SYSTEMS PLUS X BAND

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR) HAMPTON. VA PI - M°H" NASA-LARC MICHAEL, JR. CAMERIDGE . MA ol - 1 ol o SHAPIRO MIT PASADENA, CA NASA-JPL 01 - G. FJELDBO SANTA MENICA, CA RAND CORP UI - M.E. CAVIES PASADENA, CA NA SA – JPL 01 - G.S. LEVY NASA-JPL PASADENA, CA CI - C.L. CAIN RAYTHECK CERF SUCCLEY: NA CI - Mo GRUSSI STANDFORD, CA STANDFORD U DI - GoLo TYLER

#### EXPERIMENT ERIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE THE LANDER-TO-EARTH AND ORBITER-TC-EARTH S-EAND COMMUNICATIONS LINK (INCLUDING RANGE AND RANGE-RATE CAPABILITIES). THE LANDER-TO-GRBITER UFF RELAY LINK, THE RACAR ALTIMETER. THE TERMINAL DESCENT LANDING FACAR, AND THE ORBITER-TO-EARTH X-BAND DOWNLINK. THE RESULTING DATA WILL BE USED TO DETERMINE THE NARTIAN GRAVITATIONAL FIELD. AXIS OF ROTATION, EPHEMERIS, FIGURE, ATMOSPHERE, STRUCTURE, IONGSPHERE, AND SURFACE PROPERTIES. IN ADDITION, THE DATA WILL BE USED TO DETERMINE THE

LANDER LOCATION, IN RELATIVITY STUDIES, TO STUDY THE INTERPLANETARY MEDIUM. AND. IF CONDITIONS PERMIT. TO STUDY THE SOLAR CORCHA.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

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SPACECRAFT COMMON NAME- VIKING-E ALTERNATE NAMES-PL-7338

NESDC ID VIKNG-B

PLANNED LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT IN CREIT-

3216 . KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES

LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY

UNITED STATES

NASA-OSSA

PLANNED ORBIT PARAMETERS

ORBIT PERICO- 1476. MIN

ORBIT TYPE- MARSCENTRIC ORBIT PERIOD- 1476. MIN
APUAPSIS- 38410. KM ALT PERIAPSIS- 4410. KM ALT INCLINATION-

DEG

SPACECRAFT PERSONNEL (FM=PROJECT MANAGER, FS=PROJECT SCIENTIST) PM - D.J. MARTIN NASA-LARC HAMPTON, VA

## SPACECRAFT BRIEF DESCRIPTION

THE VIKING SPACECRAFT WILL CONSIST OF AN DREITER AND A LANDER. THE ORBITER WILL BE CAPABLE OF DRBITING MARS IN A HIGHLY ECCENTRIC. ELLIPTICAL GRUIT. A LANDER WILL BE SEPARATED, WILL ENTER THE MARTIAN ATMOSPHERE, AND SOFT-LAND ON THE SURFACE. ORBITAL, ENTRY. AND SCIENCE DATA FROM THE LANDER WILL BE COLLECTED AND TRANSMITTED TO EARTH. THE SPACECRAFT WILL BE A SPIN-STABLIZED. SOLAR-CELL-POWERED SATELLITE. THE ORBITER AND LANDER BOTH WILL HAVE A 90-CAY LIFE EXPECTANCY. THERE WILL BE A 500-W POWER CAPACITY FOR THE DREITER AND A 700-W CAPACITY FOR THE LANDER. SCIENTIFIC AND PHOTOGRAPHIC ANALYSIS INSTRUMENTS WILL WEIGH APPROXIMATELY 125 LB FOR THE ORBITER AND 70 LB FOR THE LANCER.

ON 12/00/69, THE SPACECRAFT MISSICH WAS APPROVED.

EXPERIMENT NAME- IMAGERY OREITER

NSSDC ID VIKNG-8-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) US GEOLOGICAL SURVEY MENLO PARK, CA PI - M. CARR FLAGSTAFF, AZ OI - W.A. BAUM . LOWELL GBSERVATORY 01 - H. MASURSKY US GEOLOGICAL SURVEY FLAGSTAFF, AZ .U.G - 10 U OF MASSACHUSETTS WISE AMHERST. MA U OF ACELAIDE OI - B.H. BRIGGS ACELAICE, AUSTRALIA

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THE VIKING ORBITER TV IMAGING EXPERIMENT INVESTIGATION WILL BE TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS. TO MONITOR THE REGIGN SURROUNDING THE LANDER. AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE GEOMETRIC RESOLUTION OF THE DRBITER IMAGING SYSTEM WILL BE 30 METERS FER LINE OR BETTER AT A REFERENCE

ALTITUDE OF 100C KM WITH IMAGE SMEARING FROM CRBITER MOTION TO EE LESS THAN 50 PERCENT OF THIS RESOLUTION. PRIOR TO LANDER SEPARATION. IT WILL BE REQUIRED TO COVER COMPLETELY WITH CONTIGUOUS PICTURES A SWATH AT LEAST 40 KM CROSS-TRACK BY SCO KM DOWN-TRACK ON A SINGLE ORBITAL PASS FROM THE NEAR-PERIAPSIS PORTION OF THE CRBIT. THE NEAR-PERIAPSIS COVERAGE REQUIREMENT AFTER LANDER SEPARATION WILL BE TO OBTAIN COMPLETE COVERAGE WITH CONTIGUOUS PICTURES OF AN AREA AT LEAST 50 KM IN RACIUS, CENTEFED ON THE LANCER, ON A SINGLE ORBITAL PASS. THE CAPABILITIES PROVIDED TO ACCOMPLISH THE ABOVE REQUIREMENTS WILL BE UTILIZED TO ACCOMPLISH THE CITER CITED FURFOSES. TO OBTAIN BOTH BROAD-AREA AND HIGH-RESOLUTION COVERAGE, IT WILL BE REQUIRED THAT IMAGERY BE DETAINABLE FROM THE PERIAPSIS AND AFCAFSIS REGIONS OF THE ORBIT USING THE SAME IMAGING SYSTEM. THE DYNAMIC RANGE WILL BE 100 TO 1. AND THE SENSITIVITY WILL BE SUFFICIENT TO OBTAIN PICTURES AS CLOSE TO THE TERMINATOR AS PRACTICAL, USING THREE COLOR FILTERS.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IR RADIOMETRY -- THERMAL MAPFING

NSSCC IC VIKNG-B-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR) DI=OTHER INVESTIGATOR)

PI - H.H. KIEFFER U DF CALIFCRNIA LA LCS ANGELES. CA

DI - G. MUNCH CAL TECH FASADENA. CA

DI - E.D. MINER NASA-JPL PASADENA. CA

DI - G. NEUGEBAUER CAL TECH FASADENA. CA

#### EXPERIMENT BRIEF CESCRIFTION

THE DEJECTIVES OF THE INFRARED RACICMETRY EXPERIMENT WILL BE TO OBTAIN SURFACE TEMPERATURE DATA FROM MARS TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE WISSIGNS TO MONITOR THE REGIONS SURROUNDING THE LANGER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED RACIOMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND AFCAPSIS REGIONS OF THE ORBIT. THE TEMPERATURE RESOLUTION WILL BE AT LEAST PLUS OR WINUS 1 DEG K AT 200 DEG K AND THE MEASUREMENT RANGE WILL BE 150 TO 300 DEG K. AT A REFERENCE ALTITUDE OF 1000 KM, THE SPATIAL RESOLUTION WILL BE 10 KM SC OR BETTER AFTER THE LANDER HAS SEPARATED FROM THE ORBITER.

UN 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IR SPECTROMETER -- WATER VAFOR MAPPING NSSDC 10 VIKNG-8-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR: OI=CTHER INVESTIGATOR)
PI - C.B. FARMER NASA-JPL PASADENA, CA
OI - D. LAPORTE NASA-JPL FASADENA, CA

# EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE IR SPECTROMETRY EXPERIMENT WILL BE TO DETERMINE THE HORIZONTAL DISTRIBUTION OF WATER VAPOR TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS. TO MONITOR THE REGION SURROUNDING THE LANDER. AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRAREC SPECTROMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE WATER VAPOR MEASUREMENT RANGE WILL BE C.C5 TO 1.0 MM FRECIPITABLE WATER WITH A RESOLUTION OF AT LEAST 0.01 MM AT C.2 MM. THE SPATIAL RESOLUTION WILL

BE 20 KM SQ OR LESS AFTER LANDER SEPARATION.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION

NSSCC IC VIKNG-B-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR) PI - A.D.C. NIER U OF MINNESCIA MINNEAPCLIS: MN GI - N.W. SPENCER NASA- GSEC GREENBELT. MD OI - M.B. KITT PEAK NATL OBS MCELROY TUSCON, AZ GI - W.B. HANSON U OF TEXAS CALLAS. TX 0I - A. SEIFF NASA-ARC MOFFETT FIELD , CA

#### EXPERIMENT BRIEF DESCRIPTION

THE VIKING ENTRY ATMOSPHERIC COMPOSITION EXPERIMENT IS DESIGNED TO PROVIDE THE COMPOSITION DATA (FOR BOTH NEUTRAL AND CHARGED SPECIES) NEEDED TO DEFINE THE PRESENT PHYSICAL AND CHEMICAL STATE OF THE MARTIAN ATMOSPHERE ... A DOUBLE-FOCUSING (ELECTROSTATIC AND MAGNETIC) MASS SPECTROMETER. MOUNTED IN AN OPENING IN THE AEROSPELL WITH ITS ELECTRON IMPACT "CPEN" ION SOURCE RECESSED BELOW THE SURFACE OF THE AEROSHELL, WILL BE USED TO MEASURE THE CONCENTRATIONS OF THE ATMOSPHERIC SPECIES THAT HAVE MASS-TO-CHARGE RATIOS FROM 1 TO 49. IT IS PLANNED THAT THE EXPERIMENT WILL CETAIN ACCURATE ALTITUDE PROFILES OF ALL SPECIES, SPECIFICALLY FCF BOTH ATOMIC AND MOLECULAR DXYGEN. CARBON MCNOXIDE. AND CARBON DIDXIDE. TWO COLLECTORS WILL BE USED. ONE FOR THE MASS RANGE FROM 1 TO 7 AMU. AND THE OTHER SINULTANEOUSLY MEASURING IN THE MASS RANGE FROM 7 TO 49 AMU. MASS SPECTRA WILL BE OBTAINED BY SWEEPING THE ION ACCELERATION VOLTAGE AND THE DEFLECTION VOLTAGE ACROSS THE ELECTROSTATIC PLATES. THE SWEEP PERICD WILL BE AFFROXIMATELY 5 SEC. AND A DYNAMIC RANGE OF 10 TO THE 5 POWER WILL BE PROVIDED WITHIN EACH SPECTRUM. A RETARDING POTENTIAL ANALYZER (RPA) WILL MEASURE THE ICNOSPHERIC PROPERTIES OVER APPROXIMATELY THE SAME ALTITUDE RANGE AS THE MASS SPECTROMETER. ITS FRONT END WILL MATE TO THE AEROSHELL SO THAT THE ENTRANCE GRID IS NEARLY FLUSH TO THE SURFACE. WEICH IS MADE CONDUCTING IN THE REGION OF THE RPA TO PROVIDE A GROUND PLANE. THE SPACE BETWEEN THE ENTRANCE GRID AND COLLECTOR WILL BE ELECTRICALLY SEGMENTED BY FIVE GRIDS WHOSE POTENTIALS DETERMINE THE ENERGY AND SIGN OF THE CHARGED PARTICLES THAT CAN REACH THE COLLECTOR. THREE DIFFERENT LINEAR VOLTAGE RAMPS WILL BE APPLIED IN SUCCESSION TO THE RETARDING GRID. ONE RAMP WILL COVER THE VOLTAGE RANGE FROM -75 V TO 0 V (IN ABOUT 1 SEC), WHICH WILL BE USED TO MEASURE SCLAR WIND ELECTRONS AND IONOS PHERIC PHOTOELECTRONS, ONE FROM -3 V TO 0 V (IN ABOUT 1 SEC), WHICH WILL BE USED TO MEASURE ELECTRON TEMPERATURE IN THE LONGSPHERE, AND THE LAST FROM +20 V TO 0 V (IN ABOUT 2 SEC), WHICH WILL BE USED TO PROVIDE ION TEMPERATURE AND ICH CONCENTRATIONS DATA. MORE EXPERIMENT DETAILS CAN BE FOUND IN, \* ENTRY SCIENCE EXPERIMENT FOR VIKING 1975, \* ICARUS, VOL 16, PG 74-91, 1972, BY A. C. NIER, ET AL.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC STRUCTURE

NSSDC ID VIKNG-8-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CTHER INVESTIGATOR)
PI ~ A+D+C+ NIER U GF MINNESCTA MINNEAPOLIS, MN
OI ~ M+B+ MCELROY KITT PEAK NATL OBS TUSCON+ AZ
OI ~ W+B+ HANSON U OF TEXAS DALLAS, TX

OI - N.W. SPENCER OI - A. SEIFF NASA-GSFC NASA-ARC GREENBELT. MO MOFFETT FIELD, CA

#### EXPERIMENT BRIEF CESCRIPTION

THE PARTICULAR ELEMENTS OF MARTIAN ATMOSPHERIC STRUCTURE TO BE DETERMINED WILL BE PRESSURE, TEMPERATURE, AND DENSITY VARIATIONS WITH ALTITUDE IN THE LOWER MARTIAN ATMOSPHERE. THE MEASUREMENTS TO BE MADE TO DETERMINE THESE ATMOSPHERIC PARAMETERS ARE ACCELERATION, FRESSURE, AND TEMPERATURE. THE ACCELEROMETER OF THE GUIDANCE AND CONTROL SYSTEM MAY BE USED FOR THE ATMOSPHERIC STRUCTURE INVESTIGATION.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

# EXPERIMENT NAME- BIOLOGY INVESTIGATION

NSSCC IC VIKNG-8-06

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR.	CI=CTHER INVESTIGATOR)
PI - H.P.	KLEIN	NASA-ARC	MCFFETT FIELD. CA
01 - J.	LEDERBERG	STANFORD L	FALC ALTC. CA
D1 - A.	RICH	MIT	CAMBRIDGE: MA
D1 - W.W.	VISHNIAC	U OF ROCHESTER	RCCHESTER. NY
OI - N.H.	HOROWITZ	NA SA - JPL	FASADENA, CA
01 - V.I.	OYAMA	NASA-ARC	CHICAGO, IL
01 - 6.4	LEVIN	BIOSPHERICS INC	RCCKVILLE, ND

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE COMPOSED OF 4 PARTS. IT WILL MEASURE -- (1) THE PHOTOSYNTHETIC AND RESPIRATORY FIXATION OF CARBON DIOXIDE. (2) THE CARBON CIOXIDE RELEASED FROM PREVIOUSLY FIXED CARBON DIOXIDE. (3) THE CARBON DIOXIDE RELEASED FROM ADDED ORGANIC COMPOUNDS. AND (4) THE LIGHT SCATTERED FROM A LIQUID SAMPLE. AS A MEASURE OF THE INCREASE IN PARTICLES.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NOLECULAR ANALYSIS

NSSCC ID VIKNG-8-07

EXPERIMENT	PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, CI=CT	ER INVESTIGATOR)
PI - K.	BI EMANN	MIT	CAMBRIDGE . MA
GI - H.C.	UREY	L OF CALIFORNIA, SD	SAN DIEGO, CA
DI - D.M.	ANDERSON	CRREL	LA JOLLA, CA
01 - T.C.	OWEN	ILLINOIS INST OF TECH	CHICAGO. IL
01 - J.	OFO	L CF HOUSTON	HEUSTON: TX
01 - L.E.	ORGEL	SALK INST EIGL STUDIES	SAN DIEGO. CA
01 - G.P.	SHULMAN	NASA-JPL	PASADENA. CA

## EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS INVESTIGATION WILL BE ANALYZE THE MARTIAN SURFACE FOR ITS ORGANIC CONTENT BY VAPORIZING MATERIAL ONTO A HIGH-EFFICIENCY GAS CHROMATOGRAPHIC COLUMN WHICH IN TURN WILL BE CONNECTED TO A FAST SCANNING (15 SEC) MASS SPECTROMETER. THE HEATING WILL BE ACCOMPLISHED IN STEPS TO VAPORIZE THOSE MATERIALS PRESENT WHICH HAVE SUFFICIENT VAFOR PRESSURE. AND ULTIMATELY TO DECOMPOSE PYROLYTICALLY NONVOLATILE SUBSTANCES INTO VOLATILE DEGRACATION PRODUCTS FROM WHICH THE NATURE OF THE MATERIAL CAN THEN BE DEDUCED. IN ORDER TO ACCOMPLISH THE OBJECTIVES OF THIS INVESTIGATION CERTAIN PRIMARY REQUIREMENTS MUST BE MET. THE SENSITIVITY OF THE MASS SPECTROMETER

SHOULD BE SUCH THAT A MASS SPECTRUM TAKEN OF A SINGLE ORGANIC COMPOUND WHICH IS 1 PART PER HUNDRED MILLION (0.01 PPM) SHOWS PEAKS WHICH ARE 1 PERCENT OF THE BASE PEAK. THE MASS RANGE REQUIRED FOR ANALYSIS WILL BE AT LEAST 12 TO 200 AMU, WITH UNIT RESOLUTION OR BETTER. THE RELATIVE DYNAMIC RANGE FOR EACH MASS SPECTRUM SHOULD BE 500 TO 1. A CONTROLLED TEMPERATURE WILL BE REQUIRED FOR VAPORIZATION PYROLYSIS UP TO EGO DEG C IN TWO OF THREE FRESCRIBED STEPS OF 30 SECONDS. PROVISIONS HAVE TO BE MADE TO ENSURE THAT THE EVOLUTION OF LARGE QUANTITIES OF GAS (AS MUCH AS 5 TO 10 PERCENT OF SAMPLE WEIGHT) DOES NOT IMPAIR THE FUNCTION OF THE MASS SPECTROMETER. THIS WAY BE ACCOMPLISHED BY VENTING THE EXCESS GAS BEFORE IT REACHES THE MASS SPECTROMETER. EIGHT DIFFERENT SAMPLES TAKEN AT SPECIFIED TIMES DURING THE FIRST 90 DAYS OF THE MISSINY COVERING CIURNAL AND SEASONAL CHANGES WILL BE STUDIED. THE ORGANIC LAVESTIGATION WILL NOT BE INITIATED UNTIL AFTER THE CFERATION OF THE ATMOSPHERIC ANALYSES REQUIRED DURING THE FIRST THREE DAYS. A SEPARATE DETECTOR AT THE GUTPUT OF THE GAS CHROMATEGRAPH AND A CARRIER GAS SEPARATOR WILL BE PROVIDED. THE DETECTOR WILL PROVIDE ADDITIONAL CHROMATOGRAPHIC DATA THAT WILL BE HELPFUL IN INTERPRETING THE MASS SPECTRA.

DN 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME - SOIL WATER

NEEDC ID VIKNG-8-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) S HORT HILL PI - R.W. BOEING SCI RSCH LABS SEATTLE, WA 01 - H.J. MOURE US GEOLOGICAL SURVEY MENLO PARK. CA 01 - R.F. SCOTT CAL TECH PASADENA, CA HUTTON 01 - R.E. TRW SYSTEMS GROUP REDONDO BEACH. CA.

## EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SOIL WATER EXPERIMENT INVESTIGATION WILL BE TO DETERMINE THE AMOUNTS AND FORMS OF GCCURRENCE OF FREE AND BOUND WATER IN SOIL SAMPLES DETAINED FROM TWO DEPTH RANGES. O TO S CM AND S TO 10 CM. THREE SAMPLES WILL BE ANALYZED AND. IF POSSIBLE, ONE ANALYSIS WILL BE CONDUCTED BEFORE AND ONE AFTER THE WAVE OF DARKENING. THE METHOD OF DETERMINATION WILL BE SCANNING CALCRIMETRY FROM AMBIENT TEMPERATURE (AS LOW AS POSSIBLE) TO AS HIGH AS POSSIBLE UP TO 750 DEG C. WITH DETERMINATION OF EFFLUENT WATER A REQUIREMENT. THE RATE OF TEMPERATURE SCAN SHOULD BE SLOW ENOUGH TO DISTINGUISH ENCOTHERMS IN A RATIO OF 1 TO 7 IN THE FIRST 30 DEG CF SAMPLE TEMPERATURE RISE. THE SAMPLE WILL CONTAIN LESS THAN ONE PART PER 10 MILLION OF WATER RELEASED FROM THE LANDER. IF FROZEN WATER EXISTS IN THE SOIL, IT WILL BE MAINTAINED SOLID UNTIL INITIATION OF THE ANALYSIS.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FACSIMILE CAMERA

NSSCC IC VIKNG-B-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR) .A.T - 19 MUTCH erown u PROVIDENCE. RI OI - C. SAGAN CORNELL U ITHACA, NY DI - A.B. BINDER ILLINOIS INST OF TECH CHICAGO, IL 01 - E.C. MORRIS US GEOLOGICAL SURVEY FLAGSTAFF. AZ OI - A-YOUNG NASA-JPL PASADENA, CA 01 - F.G. HJ CK NASA-LARC HAMPTON. VA DI - E.C. LEV INTHAL STANFORD L PALE ALTE, CA

# EXPERIMENT ERIEF DESCRIPTION

THE PURPOSE OF THE TV IMAGING INVESTIGATION FROM THE LANDER WILL BE TO VISUALLY CHARACTERIZE THE LANDING SITE. PROVIDING DATA WITH BIOLOGICAL, GEOLOGICAL, AND METEOROLOGICAL RELEVANCE. TWO CAMERAS WITH A 0.04-DEG SCANNING RESCLUTION WILL BE REQUIRED. THE VERTICAL FIELD OF VIEW FOR EACH CAMERA WILL BE 20 DEG WITH A CAPABILITY OF OBTAINING A COMPLETE 360-DEG HORIZONTAL PANORAMA. VERTICAL POINTING BY COMMAND FOR ANGULAR COVERAGE FROM 40 DEG ABOVE TO 60 DEG BELOW (OUTER EDGE OF FIELD-OF-VIEW) THE HORIZONTAL PLANE OF THE LANDER IN 10-DEG INCREMENTS WILL BE REQUIRED. AZIMUTH POINTING BY COMMAND WILL BE IN 3-DEG INCREMENTS. THE CAMERAS WILL BE MOUNTED AT LEAST 1.5 M ABOVE THE MARTIAN SURFACE AND MUST BE CAPABLE OF VIEWING TWO FOOTPADS AND THE ENTIRE AREA ACCESSIBLE TO THE SURFACE SAMPLER. EACH CAMERA MUST BE CAPABLE OF DETAINING VISUAL COLOR IMAGERY. PROVISION WILL BE MADE FOR POSSIBLE LATER MODIFICATION TO OPERATE IN THREE SPECTRAL BANDS. HORIZONTAL STEREO WITH A MINIMUM BASE OF 1 M WILL BE REQUIRED.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGY EXPERIMENT

NESDC ID VIKNG-8-10

EXPERIMENT PERSONNEL (PISPRINCIPAL INVESTIGATOR, DISOTHER INVESTIGATOR) FLORIDA STATE U TALLAHASSEE. FL PI - S.L. U OF WASHINGTON SEATTLE, WA 01 - C.B. LEOVY HAMPTON. VA HENRY NASA-LARC 01 - R.M. GENEVA, SWITZERLAND 01 - J. RYAN WMO EDULCER: CO NOAA DI - V.P. KUETTNER

## EXPERIMENT BRIEF CESCRIPTION

THE METEOROLOGICAL EXPERIMENT WILL MEASURE THE METEOROLOGICAL ENVIRONMENT NEAR THE PLANETARY SURFACE AND COTAIN INFORMATION ACCUT MOTION SYSTEMS OF VARIOUS SCALES. THE ELEMENTS TO BE DETERMINED WILL BE PRESSURE. TEMPERATURE, WIND VELOCITY. AND WATER VAPOR CONTENT OF THE MARTIAN ATMUSPHERE. DIURNAL AND TEMPORAL VARIATIONS OF THE FARMETERS WILL BE OF PARTICULAR IMPOFTANCE. PRESSURE. TEMPERATURE. AND WIND VELOCITY WILL BE MEASURED AT LEAST EVERY 2 MIN. WATER VAPOR WILL BE MEASURED AT LEAST EVERY 2 HR. ALL MEASUREMENTS ARE TO BE CONTINUED FOR THE LANDER LIFETIME. THE SENSORS MAY BE MOUNTED ON STRUCTURES ALREADY AVAILABLE SUCH AS FOOTPADS. ANTENNA MASTS. IMAGERY MASTS. OR THE SAMPLER ARM.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SEISMOLOGY

NSSDC ID VIKNG-8-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 01=0THER INVESTIGATOR) PASADENA. CA PI - D.L. ANDERSON CAL TECH CAMERIDGE. MA 01 - F. PRESS MIT CAMBRIDGE . MA CI - M.N. TUKSOZ MIT L CF HAWAII HCNOLULU. HI 01 - G. SUTTON PALG ALTO. CA DI - R.L. KUVACH STANDERED U GALVESTON, TX U OF TEXAS 01 - G.V. LATHAM

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SEISMOMETRY INVESTIGATION WILL BE TO DETERMINE THE SEISMIC BACKGROUNI AND EVENT ACTIVITY OF WARS. THREE PERPENDICULAR COMPONENTS OF GROUND MOTION WILL BE MEASURED OVER AS BROAD A FREQUENCY RANGE AS PRACTICAL (MAXIMUM EMPHASIS OVER THE BAND 0.05 TO 10 HZ). THE RESOLUTION WILL BE 50 MILLIMICRONS OR LESS OF GROUND DISPLACEMENT AT 1 HZ. WITH AN ACCURACY SUCH THAT TRUE GROUND MOTION AMPLITUDE CAN BE RECOVERED TO PLUS OR MINUS 10 PERCENT OR BETTER. DYNAMIC RANGE MAY BE INCREASED BY NARROW-BAND FILTERING OF THE SEISMIC DATA AT THREE FREQUENCIES. THE SEISMOMETER CAN BE MOUNTED EITHER IN THE EQUIPMENT AREA OF THE LANDER. ON A FOOTPAD. CR REMOTED DEPLOYMENT WILL BE THE FREFERRED MODE. THE ORIENTATION OF THE SENSOR WILL BE KNOWN TO WITHIN 5 DEG IN BOTH AZIMUTH AND ELEVATION. IF THE SENSOR IS ATTACHED TO THE LANDER, TRANSMISSIBILITY OF THE LANDER SHOULD BE GREATER THAN 0.8 FOR FREQUENCIES LESS THAN 10 HZ AND THERE SHOULD BE NO UNDAMPED RESONANCES LESS THAN AFFROXIMATELY 10 HZ.

ON 12/00/69. THE SPACECRAFT MISSIGN WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY

NSSDC ID VIKNG-B-12

والمتنافظة المستعين

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. 01=CTHER INVESTIGATOR)
PI - C.A. BARTH U OF COLURADO EDULDER. CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, TO BE MOUNTED ON THE LANDER VEHICLE, IS DESIGNED TO MEASURE THE AMOUNT OF 2500-A AND 340C-A LV RADIATION THAT REACHES THE MARTIAN SURFACE, TO DETERMINE WHETHER ATMOSPHERIC FILTERING IS DUE TO A MOLECULAR ABSORBER OR PARTICLE SCATTERING, THE DETECTOR WILL BE A. TWO-CHANNEL UV FROTOMETER WITH 100-A BANDWIDTH FILTERS FOR BOTH CHANNELS, AND A FIELD OF VIEW OF 10 DEG BY 10 DEG. THE DETECTOR WILL POINT WITHIN 30 DEG OF THE LANDER VEHICLE. BOTH CHANNELS WILL BE SAMPLED EVERY 8 MIN.

UN 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC PROPERTIES

NESCC ID VIKNG-B-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR)
PI - R.B. HARGRAVES PRINCETON U PRINCETON, NJ

EXPERIMENT BRIEF CESCRIFTION

THIS EXPERIMENT. WHICH WILL BE PART OF THE LANDER SECTION EXPERIMENTS. WILL MEASURE THE MAGNETIC PROPERTIES OF THE SURFACE PARTICLES ON MARS USING THREE MAGNETS FOR SAMPLING.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RADIO COMMUNICATION AND RADAR LANDING MISSEC ID VIKNG-8-14 SYSTEMS PLUS X BAND

EXPERIMENT PERSONNEL (PIEPRINCIPAL INVESTIGATOR, CIECTHER INVESTIGATOR)

PI - W.H. MICHAEL, JR.

NASA-LARC

HAMPTON . VA

OI - 1.1. SHAPIRO OI - G. FJELDBO MIT NASA~JPL CAMERIDGE. MA PASADENA. CA

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SANTA MONICA, CA CAVIES RAND CORP CI - M.E. NASA-JPL PASADENA, CA LEVY 01 - G.S. PASADENA . CA NASA-JPL OI - D.L. CAIN RAYTHEON CERF SUCCURY. MA CI - M. GROSSI STANDFORD, CA STANCFORD U 01 - G.L. TYLER

## EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL LTILIZE THE LANDER-TC-EASTH AND OREITER-TO-EARTH S-BAND COMMUNICATIONS LINK (INCLUDING RANGE AND RANGE-RATE CAFABILITIES). THE LANDER-TC-OFFITER UPF RELAY LINK, THE RADAR ALTIMETER, THE TERMINAL DESCENT LANDING RADAR, AND THE ORBITER-TD-EARTH X-BAND DOWNLINK, THE RESULTING DATA WILL BE USED TO DETERMINE THE MARTIAN GRAVITATIONAL FIELD. AXIS OF ROTATION, EPHEMERIS, FIGURE, ATMOSPHERE, STRUCTURE, ICNOSPHERE, AND SURFACE PROPERTIES. IN ADDITION, THE DATA WILL BE USED TO DETERMINE THE LANDER LOCATION, IN RELATIVITY STUDIES, TO STUDY THE INTERFLANETARY MEDIUM, AND, IF CONDITIONS PERMIT, TO STUDY THE SOLAR CORCNA.

UN 12/00/69. THE SPACECRAFT MISSIGN WAS APPROVED.

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SPACECRAFT CCMMON NAME- X-4
ALTERNATE NAMES- UK X-4

NESDC ID X-4

PLANNED LAUNCH DATE- 02/28/74

SPACECRAFT WEIGHT IN CREIT-

90. KG

98. DEG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES

LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

MAS

COFTRC+IC

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOC- 90. MIN

APOAPSIS- 750. KM ALT PERIAPSIS- 750. KM ALT INCLINATION-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J. TALBOT
PM - R. STANIFORTH

NASA-LARC HAWKER-SIEDELEY LANGLEY FIELD. VA STEVENAGE, ENGLAND

SPACECRAFT ERIEF DESCRIPTION

THE X-4 SATELLITE WILL BE THE SECOND TECHNOLOGICAL SATELLITE OF THE BRITISH SPACE PROGRAM WHEN IT IS PLACED IN A LOW (500 KM), CIRCULAR, SUN-SYNCHRONGUS CHBIT IN 1974 BY A NASA SCOUT LAUNCH VEHICLE. THE SPACECRAFT WILL BE PART OF ERITIAN'S CONTRIBUTION TO GARP AND THE WORLD WEATHER WATCH PROGRAM FOR THE 1970'S. PRIMARILY AN EXPERIMENTAL METEOROLOGICAL SATELLITE, THE X-4 SPACECRAFT WILL ALSO TEST THE FEASIBILITY OF USING A PROPANE GAS JET SYSTEM FOR HIGH ACCURACY (0.02 TO 0.1 DEG) TRIAXIAL ATTITUDE CONTROL. THE SPACECRAFT WILL TENTATIVELY CARRY TWO METEOROLOGICAL EXPERIMENTS -- A HIGH-RESOLUTION MULTICHANNEL INFRARED RACIONETER AND A-LOW-RESOLUTION EARTH ALBEDO RACIOMETER. THE SATELLITE WILL BE IN THE FORM OF A BOX. 80.5 CM HIGH WITH A SQUARE EASE 65.0 CM ON A SIDE. MOUNTED ON THE SATELLITE BASE FACING EARTHWARD WILL BE (1) THE IR RADIOMETER. (2) THE EARTH ALBEDO SENSOR. (3) THE ALBEDO HORIZON CETECTORS. (4) A LIGHT, INEXPENSIVE CANOPUS STAR SENSOR. (5) A COARSE SUN SENSOR ARRAY. (6) A TWO-AXIS FINE SUN SENSOR. AND (7) FOUR VMF AERIALS. ATTACHED TO EITHER SIDE OF THE BCX STRUCTURE WILL BE FLEXIBLE

DEPLOYABLE SOLAR PANELS WITH WRAPAROUND CONTACT SCLAR CELLS. THESE PANELS. WHICH WILL HAVE CONSIDERABLE STRETCH CAPABILITY, WILL BE STOWED IN CONCERTINA FASHION WITH INTERLEAVING STRIPS TO AVCID VIBRATICNAL CAMAGE DURING LAUNCH. THEY WILL BE DEPLOYED AFTER LAUNCH AND WILL MEASURE 256 CM FROM CNE PANEL TO THE OTHER. LOCATED WITHIN THE BCX-SHAFED SPACECRAFT WILL BE -+ (1) A FOUR-TRACK TAPE RECORDER WITH 1.6 MILLION BITS OF STORAGE CAPACITY. (2) STFAPPEC-COWN INTEGRATING GYROS. (3) A BATTERY. (4) A DATA ENCODER AND PROGFAMMER/ROUTER. AND (5) VARIOUS SENSOR AND ATTITUDE CONTROL ELECTRONICS. THE X-4 SATELLITE WILL BE RECORDED ON THE ONBOARD TAPE RECORDER AT INFORMATION PER ORBIT. DATA WILL BE RECORDED ON THE ONBOARD TAPE RECORDER AT SEPARATION BY CONVENTIONAL YC-YC TECHNIQUES AND THEN BROUGHT TO NEAR ZERO BY THE PRIME GAS JET SYSTEM.

ON 00/00/72. THE SPACECRAFT MISSIGN WAS AFFREVED.

EXPERIMENT NAME- FIGH-RESOLUTION MULTICHANNEL INFRARED NSSDC ID X-4 -01
RACIOMETER

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE HIGH-RESOLUTION MULTICHANNEL INFRARED RADIOMETER EEING PLANNED FOR THE X-4 SATELLITE WILL BE SIMILAR TO THE CXFORD/HERICT-WATT TYPE RADIOMETER USED IN THE NIMEUS PROGRAM.

DN 00/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EARTH ALBECT RACIONATER

NSSDC ID X-4 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=CTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT ERIEF DESCRIPTION

THE EARTH ALBEDO RADIOMETER DESIGNED FOR THE X-4 SATELLITE WILL BE A LOW-RESOLUTION INFRARED SENSOR CAPABLE OF MEASURING THE GLOBAL DISTRIBUTION OF REFLECTED SOLAR AND LONG WAVE RADIATION LEAVING THE EARTH'S ATMOSPHERE.

ON 00/00/72, THE SPACECRAFT WISSICN WAS APPRICADE.

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Sequential Listing of Spacecraft and Experiments

# Sequential Listing of Spacecraft and Experiments

The following pages contain a list of the names for all space-craft and experiments included in Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) of this Report. The order of these names is chronological, by spacecraft launch date (corresponding to NSSDC ID Code), for the active spacecraft. The planned spacecraft listing immediately follows the active spacecraft listing and is in alphabetical order by NSSDC ID Code (usually a contraction of the spacecraft common name). The order of these entries is as given in Sections 1 and 2. Each name is followed by the NSSDC ID Code and page number on which the spacecraft or experiment is described in this Report.

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## Spacecraft Name Index

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Phenomenon Measured Indexes

## Phenomenon Measured Indexes

## General Description

The Phenomenon Measured Indexes consist of (1) bar graphs showing the operational history of fields and particles experiments and (2) listings of experiments by phenomenon measured. Both of these index displays were produced with the aid of an NSSDC automated set of experiment-level phenomenon measured keywords. The search and retrieval capability made possible by these keywords is available to the space science community, and a brief description of the keyword scheme follows. Detailed descriptions of the format and content of the two index displays appear on page 471 and page 497, respectively.

Keywords are assigned to a maximum of 10 separate modes of operation for each satellite experiment. These keywords (identified in the following paragraphs) describe (a) what is measured by a given experiment mode, (b) where the measurement is made (or for remote sensors, what objects are sensed), (c) when the measurement is made, and (d) the numerical ranges for a maximum of four characteristics of the measurement (e.g., particle energy).

- a. What: A given experiment mode is considered to measure one of five basically different phenomena: (1) electromagnetic fields, (2) charged particles, (3) microscopic neutral particles, (4) macroscopic bodies, and (5) "other."
  - 1. Electromagnetic fields: In this category electric fields, magnetic fields, and electromagnetic radiation are separately identifiable. For electric and magnetic fields, the number of orthogonal components measured is specifiable; while for electromagnetic radiation (waves), the type (gamma rays through radio waves) and numerical frequency range of the measurement can be specified.
  - 2. Charged particles: For charged particles, species (e.g., protons, electrons) and an indication of the extent of species resolution can be specified. An indicator of spectral resolution, the numerical energy range, and flux directionality characteristics can all be specified.
  - 3. Microscopic neutral particles: Microscopic neutral particles may be molecules, atoms, or neutrons. Mass range and species resolution are specifiable, as is the measured characteristic (e.g., flux, density, pressure).

- 4. Macroscopic bodies: These keywords identify the body, the characteristic being measured (e.g., temperature, gravitational field), and the measurement technique (e.g., photography, seismic experiment).
- 5. Other: These keywords indicate whether the experiment is related to one of four categories: earth sciences, life sciences, material sciences, and spacecraft engineering and technology.
- b. Where: For the earth's vicinity, space is subdivided as follows:
  - 1. Earth and its lower atmosphere
  - 2. Altitude between 65 and 3000 km. In this range, space is categorized in three separate latitude intervals.
  - 3. The magnetosphere above 3000 km in six regions:
    - a. L < 2 RE
    - $b_{\circ}$   $2R_{E} < L < 6R_{E}$
    - c.  $6R_{E}^{L} < L < 10\bar{R}_{E}$
    - d. high polar ( $L > 10 R_E$ ,  $R < 10 R_E$ )
    - e. magnetotail (L > 10  $R_E$ , R > 10  $R_E$ , nightside)
    - f. dayside magnetosheath and its boundaries

Interplanetary space is subdivided into cislunar and distant regions.

Major macroscopic bodies (sun, moon, individual planets) are specifiable as the location of measurements or as the source of remotely sensed electromagnetic radiation.

c. When: In describing when data are obtained in individual experiment modes, a series of up to five dates may be specified for a given experiment. Then for each of the four time intervals thus defined, the extent of data usefulness (nominal, less than nominal, useless) is specifiable for each mode.

This discussion of the experiment keyword scheme has been brief, but most of the capabilities have been mentioned. Further information on the capabilities and use of this system is available from NSSDC.

Bar Graphs of Fields and Particles Experiment Operational History

## A. Bar Graphs of Fields and Particles Experiment Operational History

<u>Title</u>	Page
'Group I - Charged Particles - Near-Earth (65 to 3000 km Altitude)	475
Group 2 - Charged Particles - Magnetosphere (Above 3000 km Altitude, including Magnetosheath and Magnetotail)	477
Group 3 - Charged Particles - Interplanetary	484
Group 4 - Magnetic Fields - Near-Earth - Magnetosphere	493
Group 5 - Magnetic Fields - Interplanetary	494
Group 6 - Electric Fields	495

The operational history for charged particle and field experiments appearing in Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) of this Report are indexed by means of a series of bar graphs generated using the NSSDC automated file and Stromberg-Datagraphix 4060 plotter. The plots allow the user to determine quickly what fields and particles experiments are active or planned in a given energy range and/or in a given time interval. The plots also indicate the operational status of the experiments as a function of time.

The charged particle experiments are divided into three groups based on the region in which the observations were made:

- 1. Near-Earth (65 to 3000 km altitude)
- 2. Magnetosphere (above 3000 km altitude, including magnetosheath and magnetotail)
- 3. Interplanetary

The magnetic field experiments are also divided into two groups based on the region in which the observations were made:

- 1. Near-Earth Magnetosphere (a combination of Groups 1 and 2 mentioned above)
- 2. Interplanetary

The electric field experiments are indexed together.

A title at the top of each plot indicates the type of observation made and the region of observation indexed. For charged particle index plots, the threshold energy (eV/nucleon) of the energy channel of observation of an experiment is plotted as a function of the experiment operational history (years). The operational history of an active experiment is indicated by using solid line segments over periods of normal operation, by using dashed line segments over periods when the operational performance was partial, and by using dotted line segments where the experiment was inoperable or at least was placed in an operational off mode. A short vertical tick mark below the line indicates when a status change occurred. Note that a maximum of only three intervals of operation can be displayed because of restrictions in the keywording scheme used in the NSSDC automated file. A given experiment may measure one or more particle species over one or more energy channels. More detailed operational information appears in the appropriate brief description in this Report. The planned spacecraft experiments have been arbitrarily assigned an estimated operational period of two years. Note that the threshold energy scale may be distorted to accommodate the information plotted. The energy tick marks are merely approximate indicators of threshold energy. A vertical dashed line bisects each bar graph at the date on which the graph was generated, to emphasize the distinction between active and planned experiments.

The caption above each plotted time period for the threshold energy channel of a given charged particle experiment shows the spacecraft common name, the experiment number in parentheses, the energy threshold of the energy channel in FORTRAN E format, e.g., 200. = 2.E2, and the species measured. The following code is used to describe the species measured:

A = alpha particle

E = electron

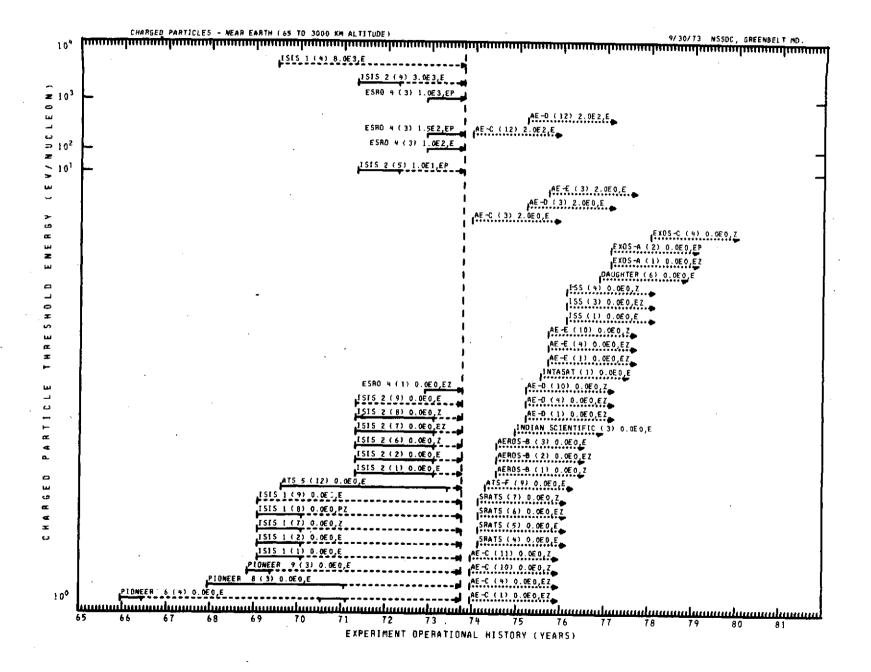
P = proton

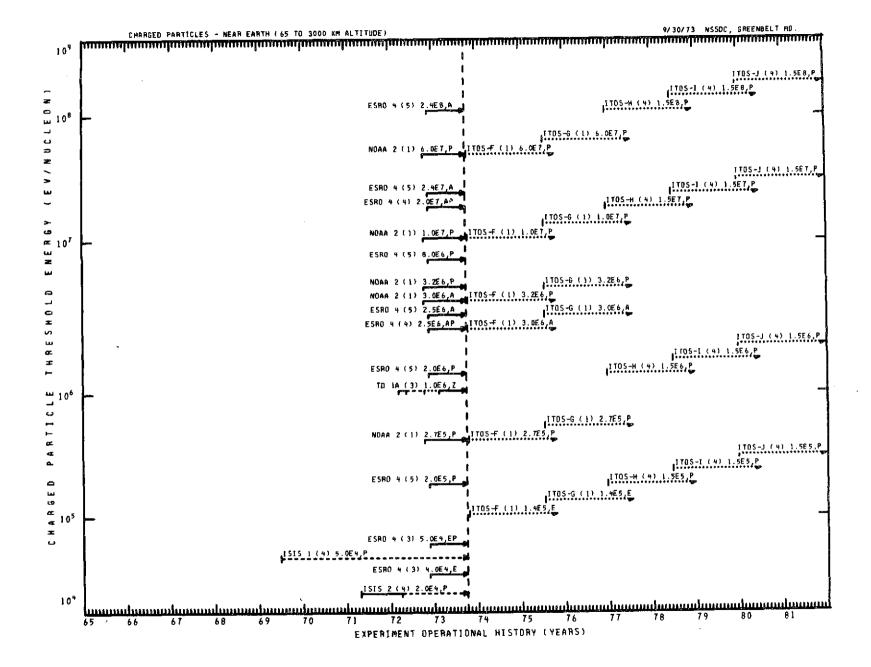
Z =other particles including deuterons, tritons, positrons, Z = 2 nuclei (not alpha particles), particles with Z > 2, and ions.

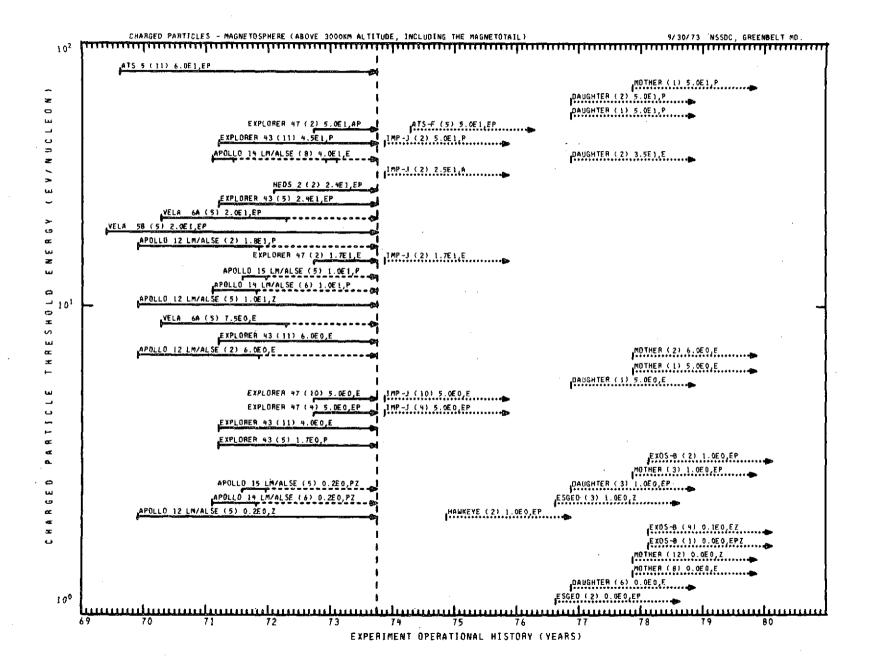
For example, the caption "PION 11 (2) 6.0E7, P" means that spacecraft Pioneer 11, experiment number 2, contains a proton energy channel with a threshold of 60 MeV/nucleon. Reference to the Spacecraft Name Index reveals this spacecraft has NSSDC ID Code 73-019A; therefore, the experiment has NSSDC ID Code 73-019A-02.

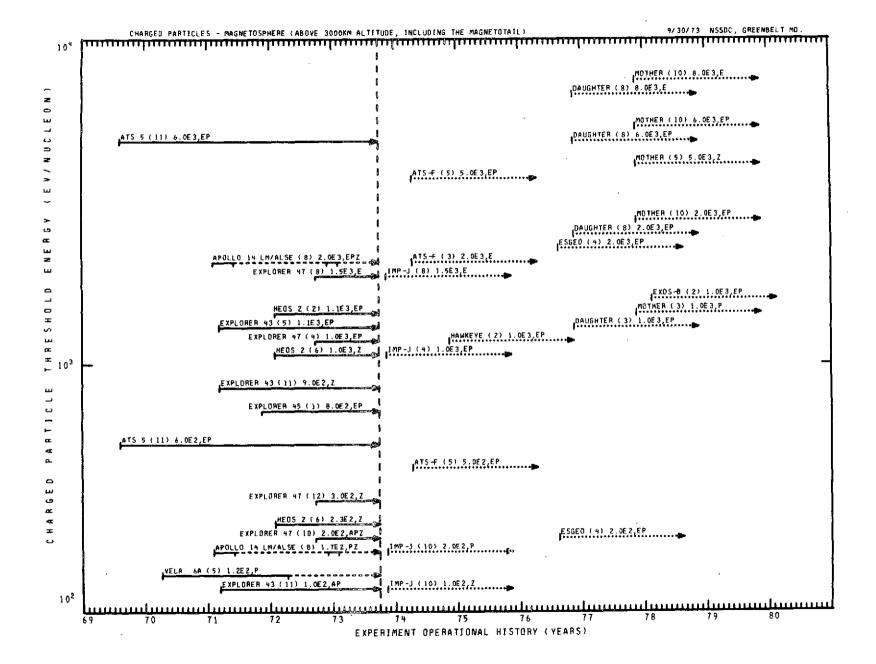
No attempt is made in this index to distinguish between directional and omnidirectional observations or to present the upper bound of the energy measurement. The appropriate brief description includes this information. Note that some experiment energy thresholds may not appear in the graphs because of the manner in which the energy ranges were keyworded in the NSSDC automated file. Note also that some thermal energy long-baseline electron measurements, e.g., experiment number 3 on Pioneers 8 and 9, appear under "Near-Earth" as well as "Interplanetary" because of assumptions made in analyzing the data.

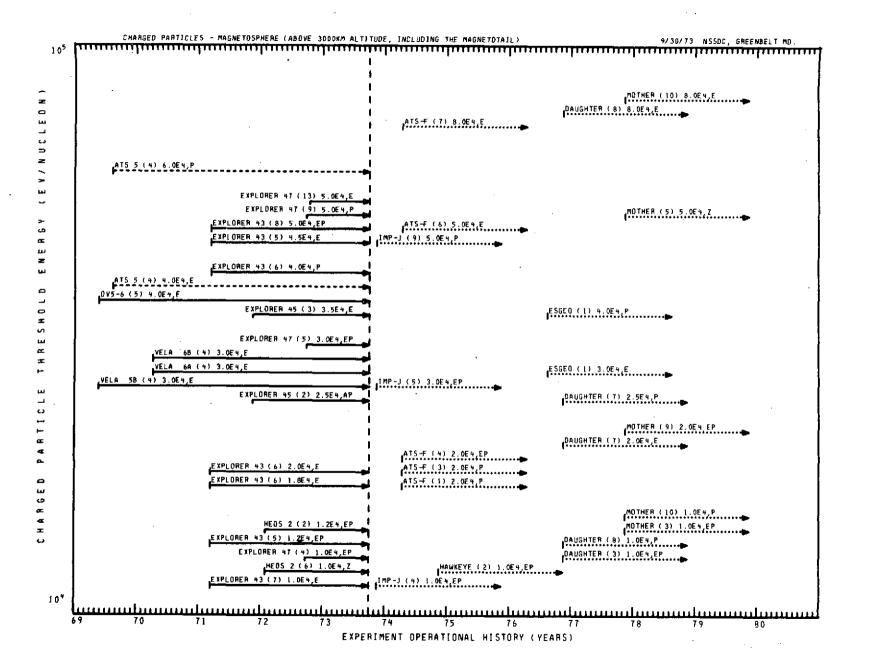
The experiment operational history of magnetic and electric field active and planned experiments is displayed on indexing plots similar to those of the charged particles, except that the experiments are ordered alphabetically along the vertical axis by spacecraft common name. Also, the caption above each plotted time period for a given experiment indicates only the spacecraft common name and experiment number. Note that the magnetic field plots include VLF experiments which measure the magnetic field component of electromagnetic radiation. Similarly, for the electric field plot, VLF experiments are included which measure the electric field component of electromagnetic radiation.

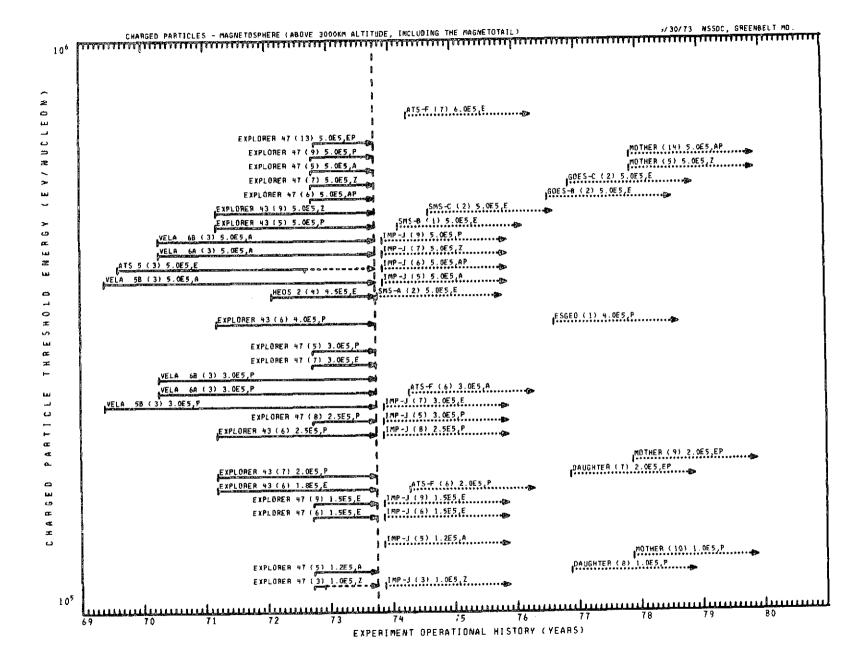


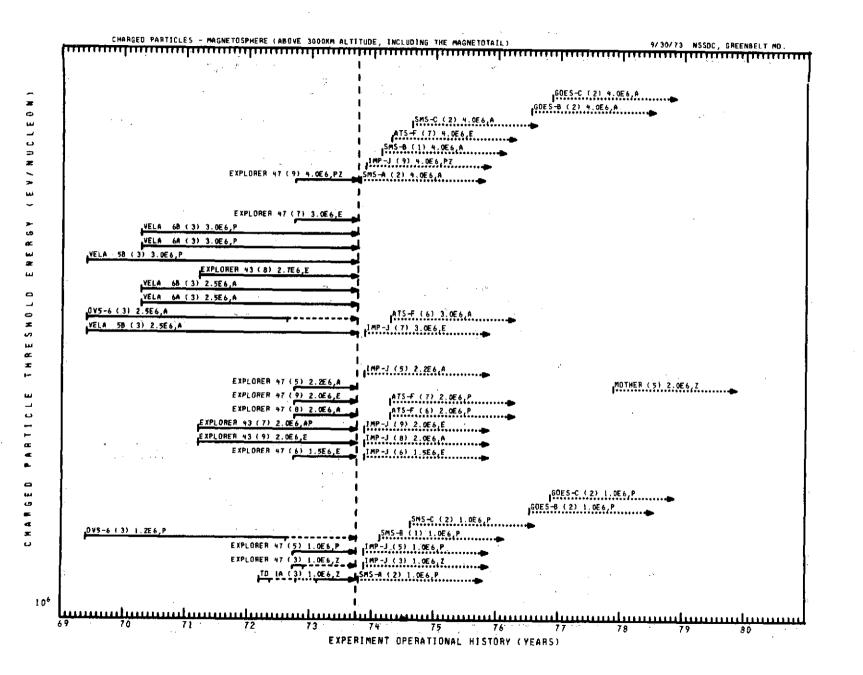


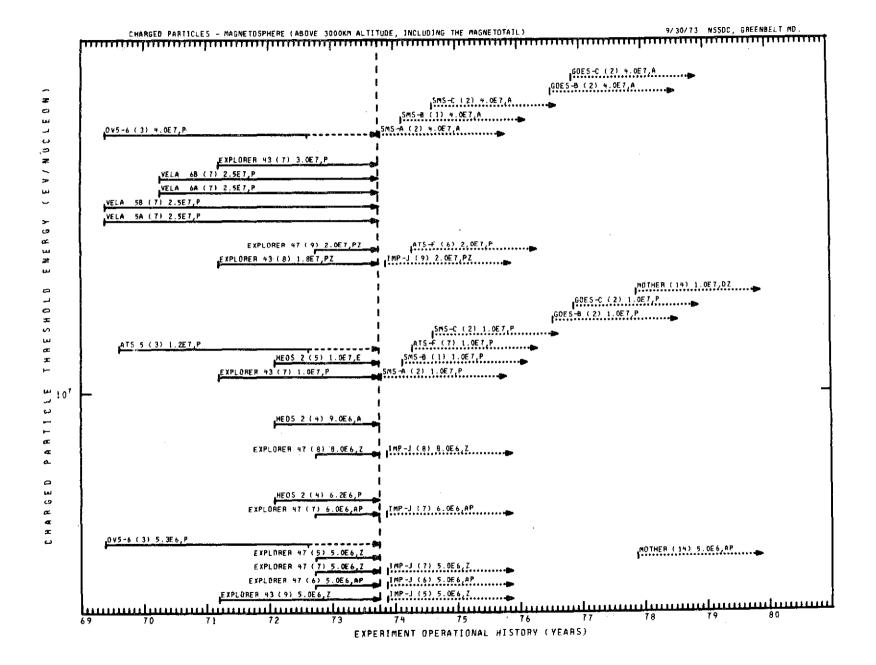


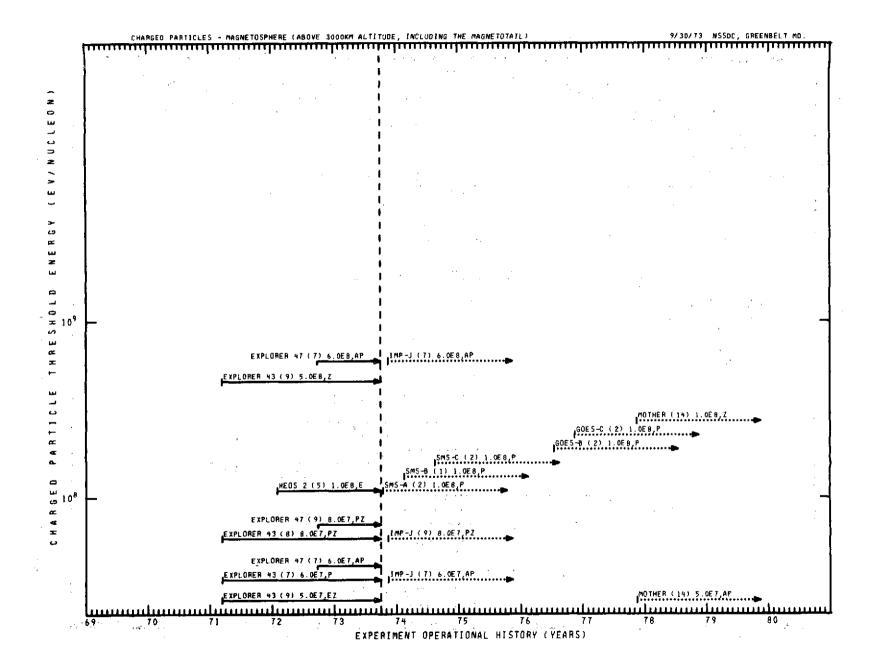


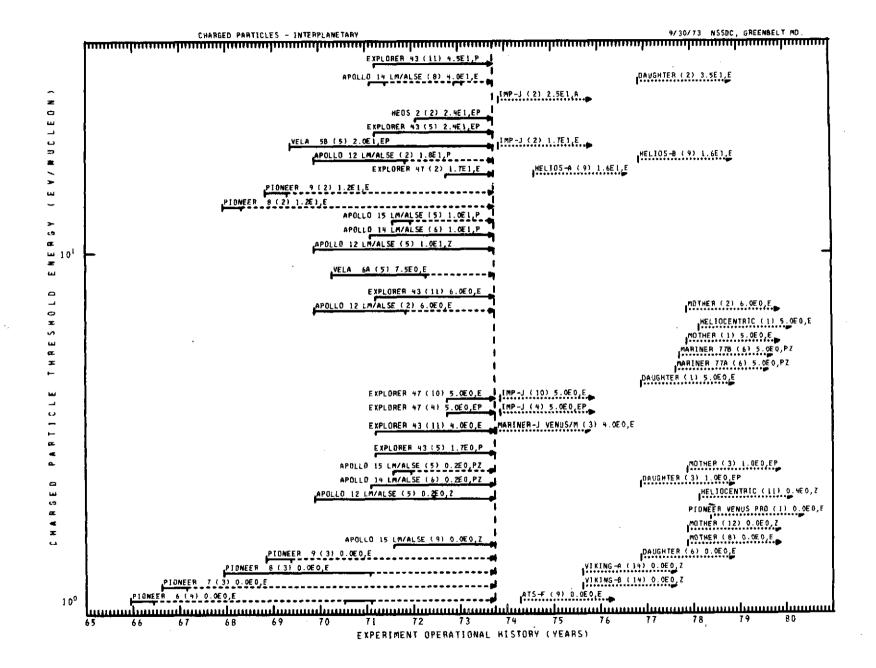


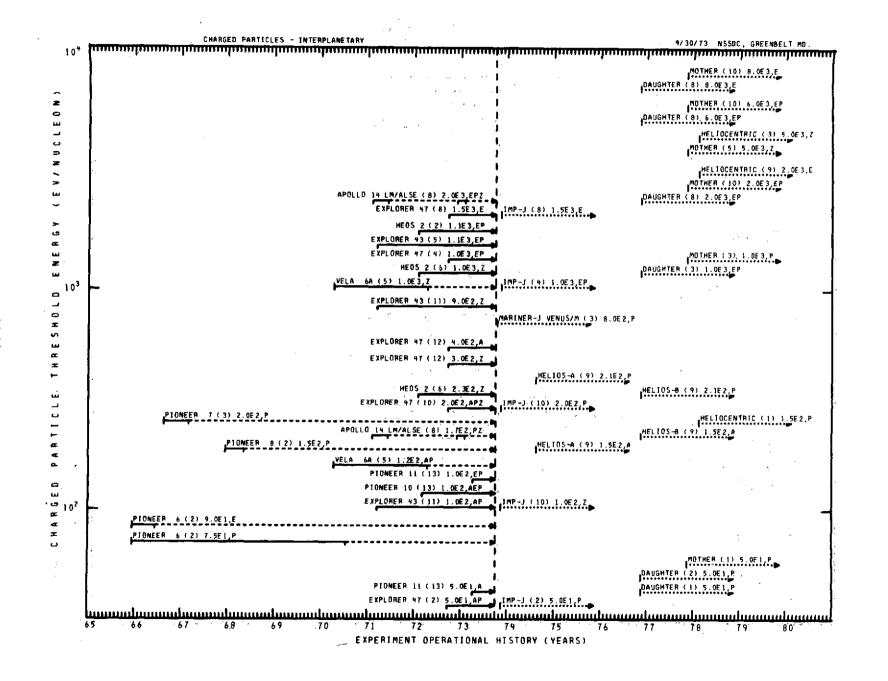


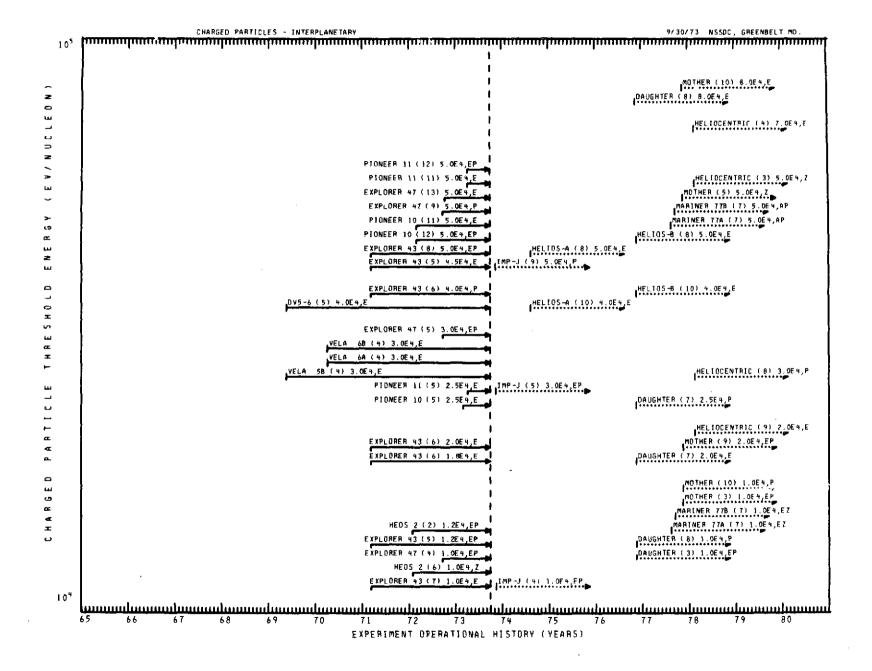












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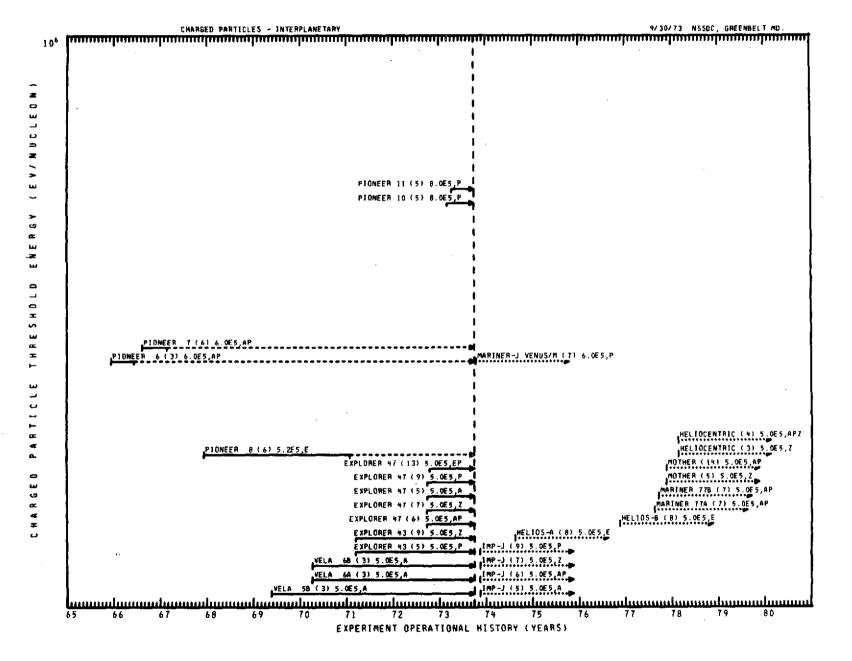
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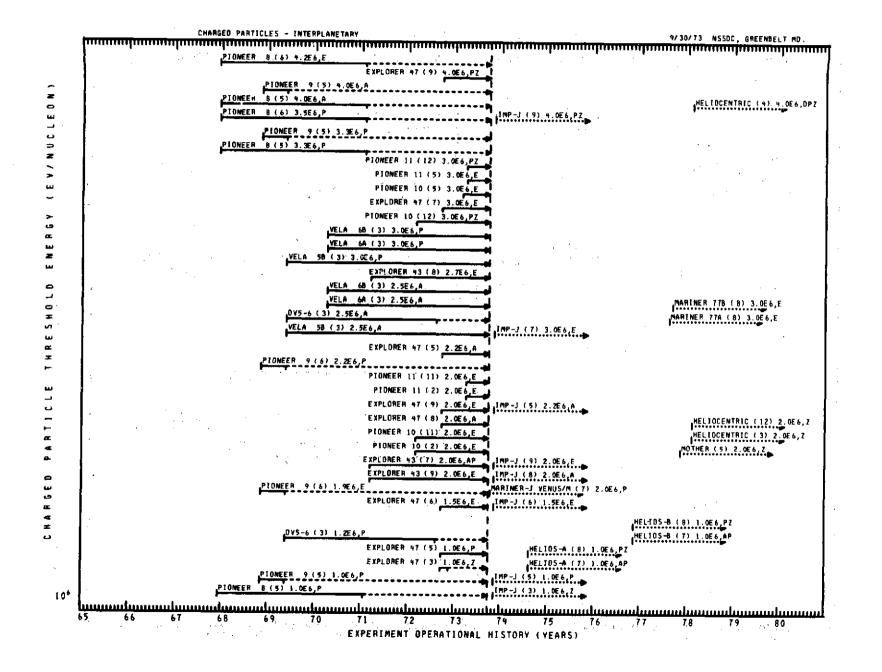
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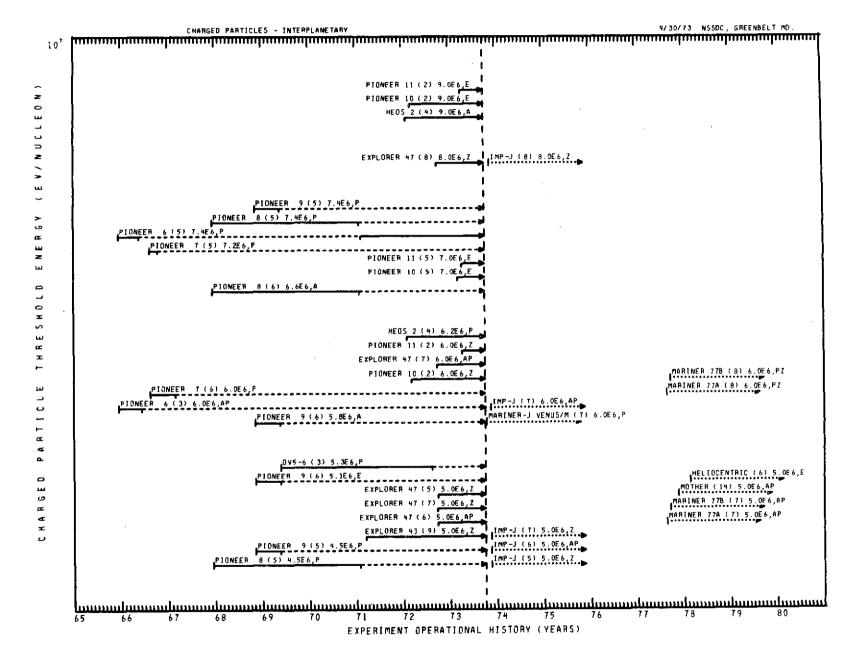
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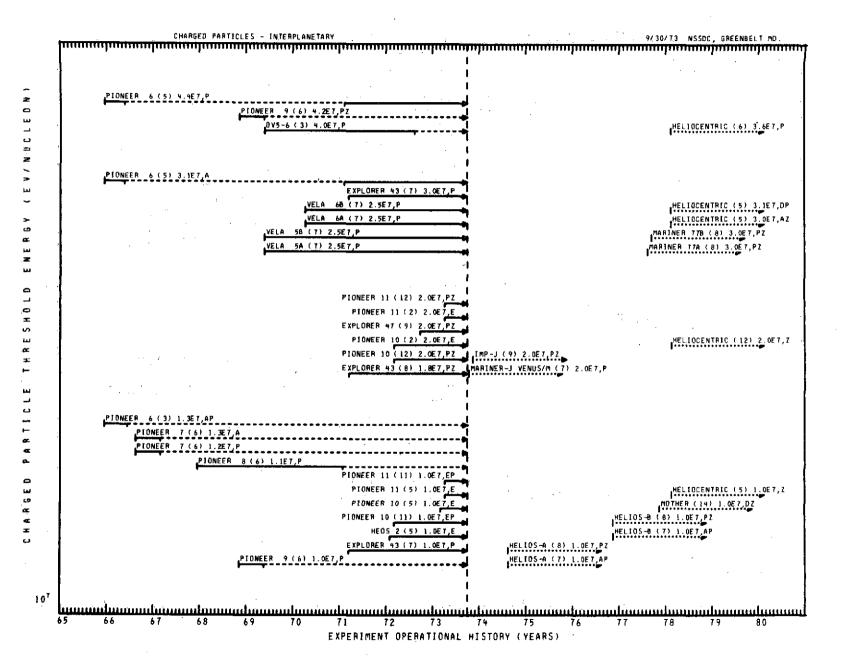
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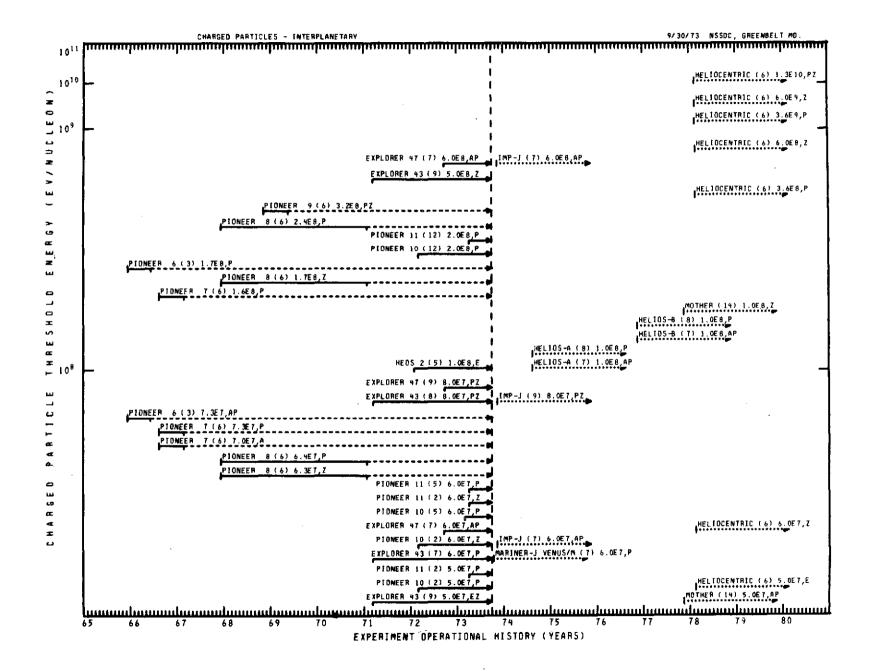
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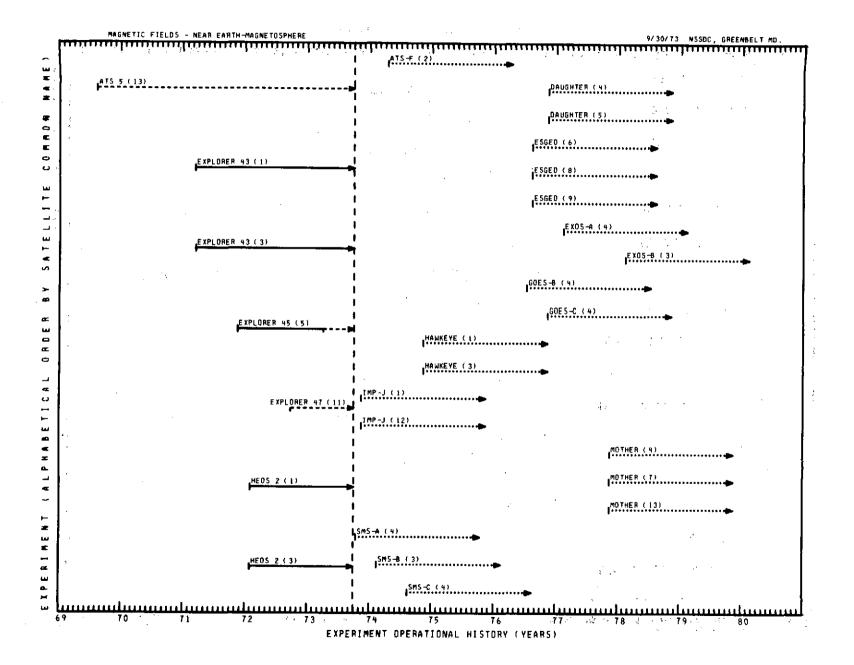


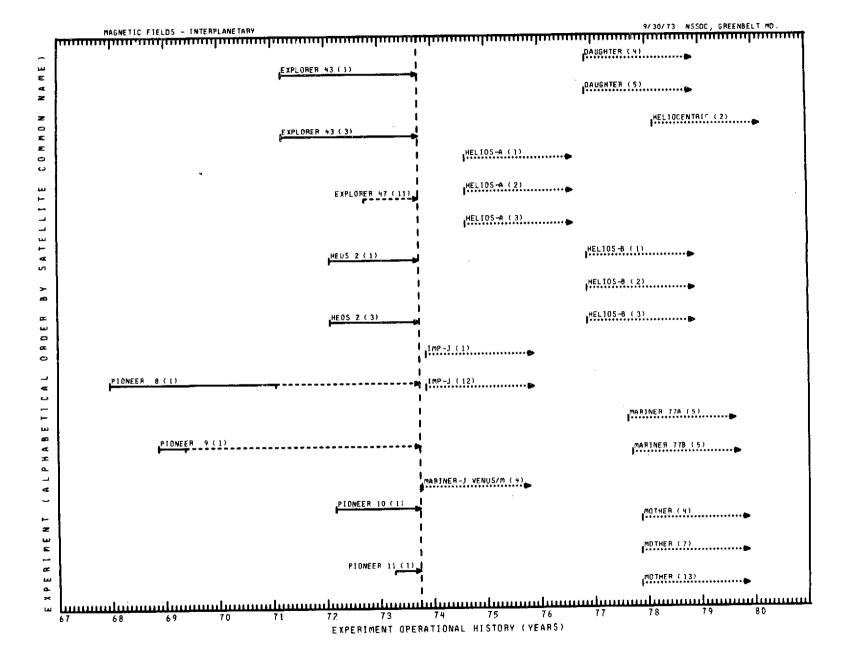


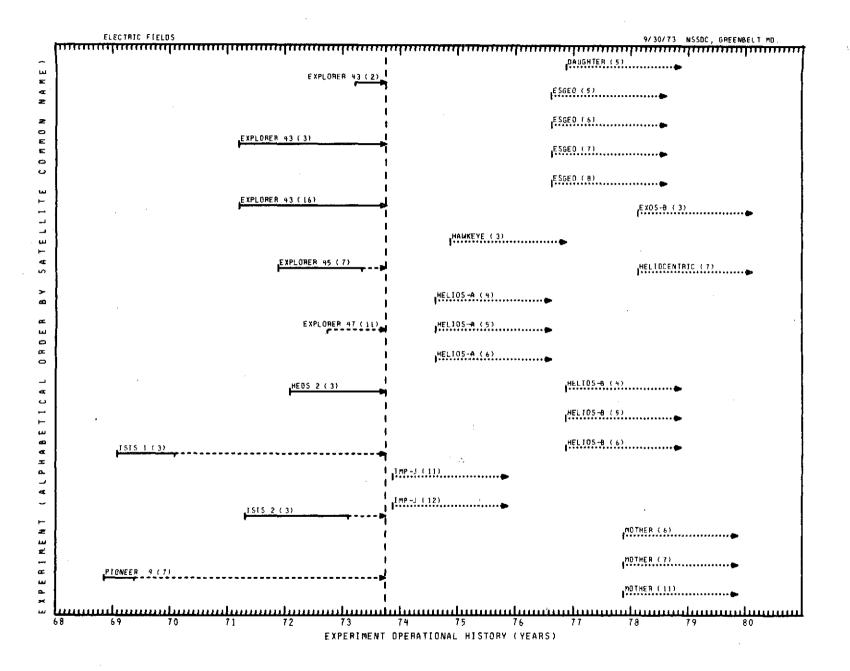












Listing of Experiments by Phenomenon Measured

## B. Listings of Experiments by Phenomenon Measured

The outline used for listing experiments according to the phenomenon measured is presented below.

## Outline

	<u>Title</u>	Page
1.	Electromagnetic Radiation Measurements	501 501 504
	section 4 for photography)	508
	1.3.1 Sensing sources below 65 km	508
	1.3.2 Sensing sources from 65 to 3000 km 1.3.3 Sensing magnetospheric sources above	513
	3000 km	515
	1.3.4 Sensing interplanetary space	516
	1.3.5 Sensing cold (planetary) sources	
	1.3.6 Sensing the sun	524
	1.3.7 Sensing hot (star) sources	528
2.	Charged Particle Measurements	532
	2.1' Sensing Electrons	532
	2.1.1 Of thermal energies (< 1 kev)	532
	2.1.2 Of energies greater than thermal (> 1 kev).	539
	2.2 Sensing Protons or Hydrogen Ions	548
	2.3 Sensing Helium Nuclei	567
	2.4 Sensing Other Particle Species	573
3.	Microscopic Neutral Measurements	582
	3.1 Sensing Neutrons	582
	3.2 Sensing Atoms and/or Molecules	583
4.	Observations of Macroscopic Bodies	588
	4.1 Sensing Mercury	588
	4.2 Sensing Venus	589
	4.3 Sensing Earth	591
	4.4 Sensing Earth's Moon	592
	4.4.1 Geographic features	NO HITS
	4.4.2 Non-geographic features	592
	4.5 Sensing Mars	593
	4.6 Sensing Jupiter	594
	4.7 Sensing the Sun	NO HITS

## Outline (continued)

	<u>Tîtle</u>	Page
	4.8 Sensing Comets, Stars, and Galactic Regions 4.9 Sensing Micrometeorites, Meteors, etc 4.10 Sensing Other Bodies	NO HITS 595 596
5.	Other  Earth Sciences  Spacecraft Engineering and Technology  Life Sciences  Material Sciences	597 597 598 598 598

The information contained under each of the major headings in the outline is uniquely sorted. For example, under Electromagnetic Radiation Measurements, the units and range of measurement are listed. The first sort is by order of minimum observable value (frequency, wavelength, or proton energy) of the measured phenomenon (one exception is that wavelengths (in outline section 1.3) are sorted from the longest to shortest of the maximum observable values); the second sort is by order of maximum observable value of the measured phenomenon; the last sort is by NSSDC ID Code.

For Charged Particle Measurements, the primary sort is by order of the minimum observable value of the measured phenomenon, then by NSSDC ID Code.

For Microscopic Neutral Measurements, the listing is sorted in order of characteristic, then by NSSDC ID Code. The keywords applicable to define "characteristic" are as follows:

Area (columnar) Density
Energy Flux
Particle Flux
Pressure
Temperature
Volume Density

The listing for Observations of Macroscopic Bodies is sorted alphabetically in order of "characteristic," then alphabetically in order of "technique," and finally by NSSDC ID Code. Keywords applicable to define "characteristic" and "technique" are as follows:

## Characteristic Technique Atmospheric Feature Orbit Analysis Distance Other Techniques Feature, Geographic Photo, High Resolution (< 1 mi) Gravity Field Photo, Low Resolution (> 100 mi) Interior Characteristic Photo, Med Resolution (I-100 mi) Particle Flux Returned Samples Size Seismic Technique Surface Characteristic Visual Observation Temperature

Information is presented in the form of tables with a variety of column headings. It should be noted that the following column headings are common to all the items in the outline.

Principal investigator name
NSSDC experiment title
NSSDC experiment ID Code
Spacecraft common name
Region of observation
Pertinent Report page number where the complete experiment entry is located.

The remaining column headings are self-explanatory except for (1) Planets, (2) Region, (3) \*, and (4) RES. Abbreviated explanations of these column headings follow.

- 1. Planets: these are indicated in numerical order from the sun. The sun is designated as zero (0); numbers 1 through 5 indicate Mercury, Venus, Earth, Mars, and Jupiter, respectively. Letter M indicates the Earth's Moon.
- 2. Region: for finer specification of location near the Earth, entries under the heading "Region" are used. The two exceptions are designations for Interplanetary (H) and Celestial (I) regions. Letters A through G indicate specific regions as follows:

- A = < 65 km altitude
- B = > 65 km altitude; < 3000 km, Lat < 65°
- C = > 65 km altitude; < 3000 km, Lat 65° to 90° D = Magnetospheric; L < 2 R<sub>E</sub>
- $E = Magnetospheric; 2 R_E < L < 6 R_E$
- F = Magnetospheric; 6 R<sub>E</sub> < L < 10 R<sub>E</sub>
- $G = Magnetospheric; L > 10 R_E$
- 3. \*: this indicates ambient or remote sensor:
  - A = Ambient
  - R = Remote
- 4. RES: this indicates species resolution:
  - R = Resolved
  - P = Partially resolved
  - N = Unresolved
  - U = Unknown resolution

"Species" here refers to the separation of phenomena at the second level of outline divisions; i.e., "resolved" species would observe the difference between protons (outline section 2.2) and electrons (outline section 2.1).

	RANGE OF MEASUREMENTS
SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (F OR E) MAX REGION PLANET * MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
1. ELECTROMAGNETIC RADIATION MEASUREMENTS	•
1.1 ELECTRIC FIELD MEASUREMENTS	
EXPLORER 43 (71-019A-02) AGGSCN ELECTROSTATIC FIELDS	A 0.000E-39 TO 7.800E-01 HZ DEFGH 60
MOTHER (MOTHER -06) MOZER DC TO 12~HZ SLECTRIC FIELD PROBE	A 0.000E-39 TO 1.200E 01 HZ DEFGH 285
MOTHER (MOTHER -11) HEPPNER DC ELECTRIC FIELDS	A 0.000E+39 TO 1.200E 01 HZ DEFGH 287
EXPLORER 43 (71-019A-16) GURNETT ELECTROST AT IC WAVES AND RADIO NOISE	A 1.000E-01 TO 1.000E 02 HZ DEFGH - 66
MOTHER (MOTHER -11) HEPPNER  DC ELECTRIC FIELDS	A 1.000E-01 TO 3.200E 03 HZ DEFGH 287
IMP-J -12) GURNETT ELECTROSTATIC WAVES AND RADIO NOISE	A 3.000E-01 TO 2.000E 05 HZ GH 246
EXPLORER 47 (72-073A-11) SCARF PLASMA WAVE EXPERIMENT	A 1.000E 01 TO 1.000E 02 HZ GH 114
MOTHER (MOTHER +07) GURNETT 10-Hz To 10-kHz MAGNETIC AND 10-Hz To 200-kHz Electric Field triaxial probes	A 1.000E 01 TO 1.000E 04 HZ DEFGH 285
EXPLORER 47 (72-073A-11) SCARF PLASMA WAVE EXPERIMENT	A 1.000E 01 TC 1.000E 05 HZ GH 114
HELIOS-A (HELIO-A-04) GURNETT COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS	A 1.000E 01 TO 1.000E 05 HZ H 224
HELIOS-A (HELIO-A-O5) GURNETT FINE FREQUENCY. COARSE TIME RESOLUTION SPECTRUM ANALYSIS	A 1.000E 01 TO 1.000E 05 HZ H 225
HELIOS-E (HELIO-B-04) GURNETT COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS	A 1.0005 01 TO 1.000E 05 HZ H 230
HELIOS-B (HELIO-B-O.E) GURNETT  FINE FREQUENCY: CGARSE TIME RESOLUTION  SPECTRUM ANALYSIS	A 1.000E 01 TC 1.000E 05 HZ H 230
HEL105-A (HEL10-A-06) GURNETT 50KHZ-2MHZ RAD10 WAVE	A 1.000E 01 TO 1.000E 05 HZ H 225
HELIUS-B (HELIU-B-06) GURNETT 50KHZ-2MHZ RACIO WAVE	A 1.000E 01 TC 1.000E 05 HZ H 230
HAWKEYE (HAWKEYE-03) GURNET1	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MEASUREMENTS Min value (f or e) max region pla * max value (lambda) min abcoefghi/0123	ANET 345m Page
1. SLECTROMAGNETIC RADIATION MEASUREMENTS		
1.1 ELECTRIC FIELD MEASUREMENTS		
ELF/VLF RECEIVERS	R 1.000E 01 TO 1.780E 05 HZ DEF	222
DAUGHTER (DAUGHTR-05) GURNETT 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD MONDAXIAL PROBES	A 1.000E 01 TO 2.000E 05 HZ DEFGH	199
MOTHER -C7) GURNETT 10-HZ TG 10-KHZ MAGNETIC AND 10-HZ TG 200-KHZ ELECTRIC FIELD TRIAXIAL PROBES	A 1.000E 01 TO 2.000E 05 HZ DEFGH	285
HEOS 2 (72-005A-03) PETERS SOLAR VLF DESERVATION	A 2.000E 01 TO 5.000E 02 HZ DEF H	88
HELIGCENTRIC (HELGCTR-07) SCARF  20-HZ TO 1-KHZ MAGNET IC AND 20-HZ TO  100-KHZ ELECTRIC FIELD DETECTORS	A 2.000E 01 TO 1.000E 05 HZ H	237
EXFLORER 43 (71-019A-03) GURNETT ELECTROSTATIC WAVES AND RADIO NÚISE 10NA	A 2.000E 01 TO 2.000E 05 HZ DEFGH	60
EXPLORER 45 (71-096A-07) GURNETT  AC ELECTRIC FIELD MEASUREMENT	A 2.000E 01 TO 2.000E 05 HZ DEF	86
ESGED (ESGED -06) GENCRIN ELECTRUMAGNETIC WAVE FIELDS	A 3.000E 01 TO 1.000E 04 HZ F	207
ISIS 1 (69-009A-03) BARRINGTON VLF RECEIVER	R 5.000E 01 TO 3.000E 04 HZ C	26
ISIS 2 (71-024A-03) BARRINGTON VLF RECEIVER	R 5.000E 01 TO 3.000E 06 HZ C	68
PIGNEER 9 (68-100A-07) SCARF PLASMA WAVE DETECTOR	A 1.000E 02 TG 1.000E 05 HZ H	22
PIONEER 9 (68-100A-07) SCARF PLASMA WAVE DETECTOR	A 3.850E 02 TO 4.150E 02 HZ H	22
PIONEER 9 (68~100A-07) SCARF PLASMA WAVE DETECTOR	A 2.775E 04 TO 3.225E 04 HZ H	22
EXOS-8 (EXOS-8 -03) UNKNOWN ELECTRUMAGNETIC FIELD FLUCTUATION DETECTORS	A DE	211
ESGEO -C5) PETIT VLF FIELD ANTENNA	A	207
ESGED (ESGEO -07) PETERSEN DC FIELDS	R F	208

	•	F	RANGE	CF	MEASURE	MENTS			
SATELLITE NAME	EXPERIMENT ID EXPERIMENTER		N I N	VALUE	(F OR E)	MAX	REGION	PLANET	
DESCRIPTIVE	EXPERIMENT TITLE	• 1	XAN	VALUE.	(LAMBDA)	MIN	ABCDEFGHI/	012345M	PAGE
1. ELECTROMAGNETIC RAD	LIATION MEASUREMENTS								
1.1 ELECTRIC FIELD MEA	SU REMENTS				•				
ES GEO	(ESGED -08) MELZNER						•		
DC ELECTRIC FIEL CAND ELECTRON BEAM DEFLECT	GRADIENT B	A		4			· F .		208
IMP-J	(IMP-J -11) AGG SON								
ELECTROSTATIC FIELDS.	************************	Α					GH		246

SATELLITE NAME DESCRIPTIVE	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	MIN VALUE * MAX VALUE		MAX RE	GIDN CDEFGHI/		
1.2 MAGNETIC FIELD MEA	SUKEMENTS						
HELIOS-A Fluxgate magnetometer	(FELID-A-02) NESS: FOR AVERAGE FIELDS:	A			н		224
HELIUS-E Fluxgate magnetometer	(HELIO-B-02) NESS FOR AVERAGE FIELDS	A			н		229
MARINER 77A TRI AXIAL FLUXGATE MAG	(MARN77A-CS) NESS Netometers	A		•	н		272
MARINER 77E Triaxial fluxgate mag	(MARN778-CE) NESS NETOMETERS	A				5	278
PIONEER 10 MAGNETIC FIELDS	(72-012A-01) SM[TH	A				5	90
FIUNEER 11 MAGNETIC FIELDS	(73-019A-01) SMITH	A				5	1 31
MARINER 77A TRIAXIAL FLUXGATE MAG	(MARN77A-05) NESS NETOMETERS	A					272
MARINER 776 Triaxial fluxgate mag	(MARN778-05) NESS NETOMETERS	A					278
MARINER 77A Triaxial fluxgate mag	(MARN77A-05) NESS NETOMETERS	A				5	272
MARINER 77E TRIAXIAL FLUXGATE MAG	(MARN77B-05) NESS Netometers	A			н		<b>27</b> 8
HELIOCENTRIC SOLAR AND INTERPLANET (CURRELATIVE STUCY)		R 0.000E-39 T	C 1.000E-0	2 HZ		o	239
HEOS 2 FLUXGATE MAGNETCMETER	(72-00EA-01) ELLIGTT	A 0.000E-39 T	TO 1.560E-0:	2 HZ	с вн		187
PIONEER 11 JOVIAN MAGNETIC FIELD	(73-019A-14) NESS	A 0.000E-39 T	ro 3.000E−08	2 HZ		5	137
ATS 5 MAGNETIC FIELD MONITO	(69-069A-13) SUGIURA	A 0.000E-39 T	ΓΟ 9•800E-02	e HZ	F		40
HELIOS-A FLUXGATE MAGNETOMETER FLUCTUATIONS	(HELID-A-01) NEUBAUER FOR FIELD	A 0.000E-39 T	0 2.500E-0	1 HZ	н		223
HELIOS-C FLUXGATE MAGNETOMETER FLUCTUATIONS	(HEL[0-8+01] NELEAUER FOR FIELD	A 0.000E-39 T	ΓΟ 2.500E-0	ı HZ	Ħ		229
FIONEER 8	(67-123A-01) NESS TER	A 0.000E-39 1	ra 5.000E-0:	ı HZ	G		11

ME ASUREMENTS

	RANGE OF MEASUREMENTS
SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (F OR E) MAX REGION PLANET * MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
1.2 MAGNETIC FIELD MEASUREMENTS	
PIONEER 8 (67-123A-01) NESS SINGLE-AXIS MAGNETOMETER	A 0.000E-39 TO 5.000E-01 HZ H 11
PIONEER 9 (68-100A-01) SQNETT THREE-AXIS MAGNETOMETER	A 0.000E-39 TO 5.000E-01 HZ H 18
PIONEER 9 (68-100A-01) SCINETT THREE-AXIS MAGNETOMETER	A 0.000E-39 TC 1.000E 00 HZ H 18
HELIDCENTRIC (HELDCTR-02) SMITH MAGNETIC FIELDS	A 0.000E-39 TO 3.000E 00 HZ H 234
ESGED (ESGED -09) MARIANI TRI AXIAL FLUXGATE MAGNETOMETER	A 0.000E-39 TO 5.000E 00 HZ F 208
EXFLORER 43 (71-019A-01) NESS MEASUREMENT OF MAGNETIC FIELDS	A 0.000E-39 TO 6.250E 00 HZ EFGH 59
CAUGHTER (CAUGHTR-C4) RUSSELL MAGNETIC FIELDS	A 0.000E-39 TC 1.000E 01 HZ EFGH 198
HAWKEYE (HAWKEYE-C1) VAN ALLEN TRIAXIAL FLUXGATE MAGNETOMETER	A 0.000E-39 TO 1.000E 01 HZ DEFGH 222
MOTHER (MCTHER -C4) RUSSELL MAGNETIC FIELDS	A 0.000E-39 TO 1.000E 01 HZ EFGH 284
IMF-J (IMP-J -01) NESS MAGNETIC FIELD EXPERIMENTS	A 0.000E-39 TO 1.250E 01 HZ GH 241
PICNEER 11 (73-019A-01) SMITH MAGNETIC FIELDS	A 7.300E-20 TO 7.300E-20 HZ. H 131
FIONEER 10 (72-012A-01) SMITH MAGNETIC FIELDS	A 7-200E-13 TO 7-200E-13 HZ H 90
HELIOCENTRIC (HELOCTR-02) SMITH MAGNETIC FIELDS	A 1.000E-01 TO 1.000E 01 HZ H 234
ESGED -06) GENDRIN ELECTROMA GNETIC WAVE FIELDS	A 1.000E-01 TO 3.500E 03 HZ F 207
EXFLORER 45 (71-096A-05) CAHILL, JR. SEARCH COIL MAGNETOMETER	A 1.000E 00 TO 3.000E 03 HZ 8 DE 85
HELIOS-A (HELIO-A-C3) NEUBALER SEARCH COIL MAGNETOMETER	A 5.000E 00 TO 3.000E 03 HZ H 224
HELIOS-E (MELIO-8-03) NEUBAUER SEARCH COIL MAGNETOMETER	A 5.000E 00 TO 3.000E 03 HZ H 229
EXPLORER 47 (72-073A-11) SCARF	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (FOR E) MAX * MAX VALUE (LAMBDA) MIN	REGION PL ABCDEFGHI/012	ANET 345M PAGE
1.2 MAGNETIC FIELD MEASUREMENTS			
PLASMA WAVE EXPERIMENT	A 1.000E 01 TO 1.000E 02 HZ	GH	114
DAUGHTER (DAUGHTR-05) GURNETT  10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO  200-KHZ ELECTRIC FIELD MONDAXIAL PROBES	A 1.000E 01 TO 1.000E 04 HZ	DEFGH	199
MOTHER -C7) GURNETT  10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO  200-KHZ ELECTRIC FIELD TRIAXIAL PROBES	A 1.000E 01 TO 1.000E 04 HZ	DEFGH	285
EXPLORER 47 (72-073A-11) SCARF PLASMA WAVE EXPERIMENT	A 1.000E 01 TO 1.000E 05 HZ	GH	114
HAWKEYE (HAWKEYE-03) GURNETT ELF/VLF RECEIVERS	R 1.000E 01 TO 1.780E 05 HZ	DEF	222
HEOS 2 (72-005A-03) PETERS SOLAR VLF OBSERVATION	A 2.000E 01 TC 5.000E 02 HZ	DEF H	88
EXPLORER 43 (71-019A-03) GURNETT ELECTROSTATIC WAVES AND RADIO NDISE IDNA	A 2.000E 01 TO 2.000E 05 HZ	DEFGH	60
MOTHER (MOTHER -13) HELLINELL VLF WAVE INJECTION	R 1.000E 03 TO 2.000E 04 HZ	DEFGH	288
ATS-F (ATS-F -02) COLEMAN, JR.  MAGNETOMETER EXPERIMENT	, A	F	191
SMS-B (SMS-B -03) WILLIAMS MAGNETIC FIELD MGNITOR	, A	F	325
EXOS-8 (EXOS-E -03) UNKNOWN ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS	. А	DE	211
EXOS-A (EXOS-A -C4) UNKNOWN MAGNETOMETER	. A	c	210
GOES-B (GCES-B -04) UNKNOWN MAGNETIC FIELD MONITOF	• A	F	216
GDES-C (GDES-C -04) WILLIAMS MAGNETIC FIELD MUNITUR	. ,	F	219
MARINER-J VENUS/MERCURY (MARINJ -04) NESS FLUXGATE MAGNETOMETER	. A	н	268
SMS-A (SMS-A -04) WILLIAMS MAGNETIC FIELD MONITOR	• A	F	323
SMS-C -04) UNKNOWN MAGNETIC FIELD MONITOF	• A	F	329

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RANGE OF

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MIN VALUE * MAX VALUE		REGION PLA ABCDEFGHI/0123	
1.2 MAGNETIC FIELD MEASUREMENTS				
MARINER-J VENUS/MERCURY (MARINJ - 04) NESS FLUXGATE MAGNETOMETER	<b>A</b>		•	268
MARINER-J VENUS/MERCURY (MARINJ -04) NESS			-	200
FLUXGATE MAGNETOMETER	^	•	2	268
ESGEO (ESGEO -C8) MELZAER  DC ELECTRIC FIELD AND GRADIENT B				
ELECTRON BEAM DEFLECTION	<b>A</b>		F	208
IMP-J (IMP-J -12) GURNETT ELECTROSTATIC WAVES AND RADIO NOISE	<b>A</b>		GH	246

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX REGION PLANET * MAX VALUE (LAMBOA) MIN ABCDEFGHI/012345M PAGE
1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGR	RAPHY)
1.3.1 SENSING SOURCES BELOW 65 KM	
NIMBUS-F (NIMBS-F-09) HOUGHTON PRESSURE-MODULATED RADIOMETER (PMR)	R A 3 293
NIMBUS 5 (72-097A-04) WILHEIT, JR. ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR)	R 1.935E 10 TO 1.935E 10 HZ A 3 129
NIMBUS 5 (72-097A-03) STAELIN	
NIMBUS-E MICROWAVE SPECTROMETER (NEMS)	R 2.222E 10 TO 6.438E 10 HZ A 3 129
NIMBUS-F (NIMBS-F-10) STAELIN SCANNING MICROWAVE SPECTROMETER (SCAMS)	R 2.222E 10 TO 6.522E 10 HZ A 3 294
NIMBUS-F (NIMBS-F-03) WILHEIT, JR. ELECTRICALLY SCANNING MICROWAVE	R 3.700F 10 TO 3.700F 10 HZ A 3 291
RADIOMETER (ESMR)	R 3.700 E 10 TO 3.700 E 10 HZ A 3 291
ITOS-H (ITOS-H -02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 5.455E 10 TO 5.455E 10 HZ A 3 258
ITOS-I (ITOS-1 -02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 5.455E 10 TD 5.455E 10 HZ A 3 261
ITOS-J (ITOS-J -02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER	
(TOV5)	R 5.455E 10 TO 5.455E 10 HZ A 3 263
TIROS-N (TIROS-N-02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 5.455E 10 TO 5.455E 10 HZ A 3 335
	*** ** 314332 10 10 344332 10 112 1
NIMBUS+F (NIMBS-F-05) SMITH EARTH RADIATION BUDGET (ERB)	R 5.000E 01 TO 2.000E-01 MIC A 3 292
ITOS-H (ITOS-H -02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 3.000E 01 TO 3.800E 00 NIC A 3 258
ITOS-I (ITOS-I -02) NESS STAFF TIRGS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 3.000E 01 TO 3.000E 00 MIC A 3 261
	A SECURE OF THE SECURE OF MIC A SECURE
ITOS-J (ITOS-J +02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER {TOVS}	R 3.000E 01 TO 3.800E 00 MIC A 3 263
TIROS-N (TIROS-N-02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER	
(TOVS)	R 3.000E 01 TO 3.800E 00 MIC A 3 335

SATELLITE NAME	EXPERIMENT AS ESTATEMENT		RANGE OF						
DESCRIPTIVI	EXPERIMENT ID EXPERIMENTER E E X P E R I M E N T T I T L E	*	MAX VALUE		(F OR E) (LAMBDA)	MAX MIN	REGION PL ABCDEFGHI/012	T 345 M	PAGE
1.3 ELECTROMAGNETIC	RADIATION (SEE SECTION & FOR PHOTOGRAP	HY)							
1.3.1 SENSING SOURCES	S BELDW 65 KM								
NI MBUS-F	*	-							
LIMB RADIANCE INVERS	(NIMBS-F-04) GILLE Sion radiometer	R	2.500F 01	<b>T</b> 13	8.800F 00	MIC	Δ	3	292
NIMBUS 5	(72-097A-01) SMITH . E PROFILE RADIOMETER			_				,	272
(ITPR)	*************************	R	2.200E 01	τo	1.100E 01	MIC	A	3	128
NIMBUS 5									
SELECTIVE CHOPPER R	ADIOMETER (SCR)	R	2.000E 01	ТΟ	8.000E 00	MIC	A	3	128
NOAA 2 VERTICAL TEMPERATURE	(72-082A-04) NESS STAFF E Profile radiometer								
(VTPR)	• • • • • • • • • • • • • • • • • • • •	R	1.870E 01 1	TO	1.200E 01	MIC	A	3	119
ITOS-F VERTICAL TEMPERATURE	(ITOS-F -04) NESS STAFF E PROFILE RADIOMETER								
(VIPK)	• • • • • • • • • • • • • • • • • • • •	R	1.870E 01 T	ro	1.200E 01	MIC	<b>A</b> .	3	253
VERTICAL TEMPERATURE	(ITOS-G -04) NESS STAFF Profile radiometer								
(V) PR) = = = = = = = = = = = = = = = = = = =	*************************************	Ħ	1.870E 01 1	го	1.200E 01	MIC	A	3	256
NIMBUS 4 SELECTIVE CHOPPED DA	(70-025A-10) HOUGHTON	_							
	ADIOMETER (SCR)	R	1.500E 01 T	ם ז	1.450E 01	MIC	A	3	46
NIMBUS-F HIGH-RESOLUTION INFR	(NIMBS-F-02) MCCULLECH PARED RADIATION								
SOUNDER (HIRS)	*******************************	R	1.500E 01 T	0	6.900E-01	MIC	A .	Э	291
ERTS-B	(ERTS-B -02) UNKNOWN								
	R (MSS)	R	1.260E 01 T	ro	1.040E 01	MIC	<b>A</b> :	3	204
NOAA 2 SCANNING RADIOMETER	(72-082A-02) NESS STAFF	R	1.250E 01 T	го	1.050E 01	MIC	<b>A</b> :	3	117
NDAA 2 VERY HIGH RESCLUTION	(72-082A-03) NESS STAFF RADIOMETER (VHRR)	R	1.250E 01 T	ľø	1.050F 01	MIC	Δ .	3	110
ATS-F GEOSYNCHRONOUS VERY	(ATS-F -CE) SHENK		·•	•		.410		J	118
RADIOMETER (GVHRR)	HIGH RESOLUTION	R	1.250E 01 T	.0	1.050E 01	MIÇ	A :	3	193
ITOS-F SCANNING RADIOMETER	(ITOS-F -02) NESS STAFF	R	1.250E 01 T	G	1.050E 01	MIC	<b>A</b> 3	3	252
ITOS-F	(ITUS-F -03) NESS STAFF RADIGMETER (VHRR)		•					-	
	·	к	1.250E 01 T	U	1.050E 01	MIC	А 3	3	252
ITOS-G	(ITOS-G -02) NESS STAFF								

MULTISPECTRAL SCANNER (MSS)...... R 1-100E 00 TO 5-000E-01 MIC A

MEASUREMENTS

104

RANGE DF

SATELLITE NAME	EVO FO TUENS AS SOME	RANGE CF	MEASUREMENTS	
	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	# MAX VALUE	(F GR E) MAX (LAMBDA) MIN	REGION PLANET ABCOEFGHI/012345M PAGE

- 1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGRAPHY)
- 1.3.1 SENSING SOURCES BELOW 65 KM

			•			
	ERTS-8	(ERTS-B -02) UNKNOWN		,		
		ER (MSS)	R 1-100E 00 TO 5-000E-01 MIC	<b>A</b> :	3	204
	ERTS 1 RETURN BEAM VIDICON	(72-058A-01) WEINSTEIN (RBV) CAMERA SYSTEM				
		THOU F CHACK OF SELMESS SESSESSESSESSES	R 8.300E-01 TO 4.750E-01 MIC	A :	3	103
	ERTS-8 RETURN BEAM VIDICON	(ERTS-E -01) WEINSTEIN (RBV) CAMERA SYSTEM	R 8.300E-01 TO 4.750E-01 MIC	<b>A</b> :	3	203
	GDES-C VISIBLE-INFRARED SPI	(GOES-C -01) NESS STAFF				
	(VISSR)	************	R 7.500E-01 TO 5.550E-01 MIC	<b>A</b> :	3	218
	GOES-8 VISIBLE-INFRARED \$PI	(GOES-B -01) UNKNOWN N-SCAN RADIOMETER				
	(VIS5R)	***************************************	R 7.500E-01 TO 5.500E-01 MIC	A 3	3	215
	ATS-F GEUSYNCHRONOUS VERY					
	RADIOMETER (GYHRR)	*************************	R 7.500E-01 TO 5.500E-01 MIC	A :	3	193
). -	SMS-A VISIBLE-INFRARED SPI	(SMS-A -01) NESS STAFF N-SCAN RADIOMETER				
	(VISSR)	**************	R 7.500E-01 TO 5.500E-01 MIC	A :	3	321
	SMS-B VISIBLE-INFRARED SPI	(SMS-B -04) NESS STAFF N-Scan Radiometer				
	(VISSR)	***************************************	R 7.500E-01 TO 5.500E-01 MIC	A s	3	325
	SMS-C VISIBLE-INFRARED SPI	(SMS-C -01) NESS STAFF N-SCAN RADIOMETER		*		
	(VISSR)	************	R 7.500E-01 TO 5.500E-01 MIC	<b>A</b> 3	3	327
	NOAA 2	(72-082A-02) NESS STAFF			•	
		(SR)	R 7.300E-01 TO 5.200E-01 MIC	А з	3	117
	NOAA 2	(72-082A-03) NESS STAFF				
		RACIOMETER ( VHRR )	R 7.300E-01 TO 5.200E-01 MIC	A 3	3	118
	ITOS-F SCANNING PARTOMETER	(ITOS-F -Q2) NESS STAFF				
		(SR)	R 7-300E-01 TO 5-200E-01 MIC	Е А	3	252
	ITUS-F VERY HIGH RESOLUTION	(ITOS-F -Q3) NESS STAFF RADIOMETER (WHRR)	B 7 3005 04 70 5 5005 11 11 11			
	•	•	R 7.300E-01 TO 5.200E-01 MIC .	E A	ł	252
	ITOS-G SCANNING RADIOMETER (	(ITOS-G -02) NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC .	_	_	
		•	* 1.000E-01 10 21500E-01 MIC 1	Е А	3	255
	ITOS-G VERY HIGH RESOLUTION	(ITOS-G -03) NESS STAFF RADIOMETER (VHRR)	R 7.300E-01 TO 5.200E-01 MIC	A 3		256

			RANGE	OF		ME ASU REMI	ENTS			
SATELLITE NAME	EXPERIMENT ID EXPERIMENTER		MIN	VALUE	. (	F OR E)		REGION ABCDEFGHIA	PLANET	PAGE
DESCRIPTIVE	EXPERIMEN <b>T</b> TITLE	*	MAX	VALUE	- '	LAMBUA	WIG	ABCOEFGIII	UILUASIA	, ,,,,
1.3 ELECTROMAGNETIC RAD	IATION (SEE SECTION 4 FOR PHOTOGRAPHY	)								
1.3.1 SENSING SOURCES 8	ELOW 65 KM									
ADVANCED VERY NICH DES	([TOS-H -01) NESS STAFF									
RADIOMETER (AVHRR)	********************	R	7.000	E-01	ŤO	5.000E-01	MIC	A	3	258
1705-1	(ITOS-I -01) NESS STAFF									
ADVANCED VERY HIGH RES RADIOMETER (AVHRR)	GLUT IGN	R	7.000	E-01	TO	5.000E-01	MIC	A	3	260
ITOS-J ADVANCED VERY HIGH RES	(ITOS-J -01) NESS STAFF GOLUTION									
RADIOMETER (AVHRR)		R	7.000	E-0 1	то	5.000E-01	MIC	. <b>A</b>	3	263
TIRDS-N ADVANCED VERY HIGH RES	(TIROS-N-01) NESS STAFF									
RADIOMETER (AVHRR)	******************	R	7.00	)E-01	TO	5.000E-01	MIC	Α	3	334
ESSA 8	(68-114A-01) NESS STAFF									
AUTOMATIC PICTURE TRAN	> = = = = = = = = = = = = = = = = = = =	R	6.50	DE-01	TO	4. 500E -01	MIC	: A	3	23
1411100 4	(70-025A-05) HEATH									
BACKSCATTER ULTRAVIOLE SPECTROMETER	ET (BUV)	R	3.40	E-01	TO	2.500E-01	міс	. <b>A</b>	3	44
MARINER-J VENUS/MERCURY EUV SPECTROSCOPY	(MARINJ -05) BRGADECCT	F	R 1.65	7E-01	ΤĐ	4.750E-02	MIC	: A I	1 23	268
x <b>-4</b>	(x-4 -01) UNKNOWN									
HIGH-RESOLUTION MULTIC	CHANNEL INFRARED	F	R						3	355
x-4	(X-a -02) UNKNOWN								_	365
	R	F	R						3	355

	SATELLITE NAME EXPERIMENT ID EXPERIMENTER , DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX REGION PLANET * MAX VALUE (LOBOMBA) MIN ABCDEFGIO 12345M PAGE
	1.3.2 SENSING SOURCES FROM 55 TO 3000 KM	
	ISIS 1 (69-0094-01) WHITTEKER SWEEP FREQUENCY SOUNDER	R 1.000E 05 TO 2.000E 07 HZ C 25
	ISIS 2 (71-024A-01) WHITTEKER SWEEP FREQUENCY SOUNDER	R 1.000E 05 TO 2.000E 07 HZ · C 67
	ISIS 2 (71-024A-02) CALVERT FIXED FREQUENCY SOUNDER	R 1.200E 05 TO 9.300E 06 HZ C 68
	ISIS 1 (69-009A-02) CALVERT FIXED FREQUENCY SCUNDER	R 2.500E 05 TO 9.300E 06 HZ C 26
	ATS-F (ATS-F -C5) DAVIES RADIO BEACON	R 4+000E 07 TO 3-600E 08 HZ B H 193
	INTASAT (INTASAT-01) UNKNOWN IONOSPHERIC BEACON	R 4.001E 07 TO 4.101E 07 HZ C 248
	ISIS 1 (69-009A-09) FORSYTH RADIO BEACON	R 1.360E 08 TO 1.370E 08 HZ C 29
	ISIS 2 (71-024A+09) FORSYTH RADIO BEACON	R 1.350E 08 TO 1.370E 08 HZ C 72
513	ATS 5 (69-069A-12) DARUSA RADIO BEACON	R 1.370E 08 TO 4.120E 08 HZ B 39
	DAUGHTER (DAUGHTR-GE) HARVEY RADIO PROPAGATION RECEIVER	R 3.000E 08 TO 3.000E 08 HZ B GH 199
	ISIS 2 (71-024A-12) SHEPHERD 6300-A PHUTOMETER	R 7.500E-01 TO 6.300E-01 MIC BC 73
	AE-C (AE-C -14) HAYS AIRGLOW PHOTOMETER	R 7.330E-01 TO 3.371E-01 MIC B 156
	AE-D (AE-D -13) HAYS AIRGLOW PHOTOMETER	R 7.330E-01 TO 3.371E-01 MIC BC 167
	AE-E (AE-E -11) HAYS AIRGLOW PHOTOMETER	R 7.330E-01 TO 3.371E-01 MIC B 175
	ISIS 2 (71-024A-11) ANGER 3914- TO 5577-A PHOTOMETER	•
	ASTP (ASTP -03) DONAHUE ULTRAVIOLET ATMOSPHERIC ABSORPTION	· · · · · · · · · · · · · · · · · · ·
	EXOS-A (EXOS-A -03) UNKNOWN X-RAY AND ULTRAVICLET AURORAL TELESCOPES	
•	SRATS -CE) TOHMATSU	
	EARTH ULTRAVIOLET ALBEDO	R 2.900E-01 TO 2.500E-01 MIC B 332

			•
SATELLITE NAME	EXPERIMENT ID EXPERIMENTER	MIN VALUE (F OR E) MA	CREGION PLANET
DESCRIPTI	VÉ EXPERIMENT TITLE	* MAX VALUE (LAMBDA) MI	N ABCDEFGHI/012345M PAGE
1.3.2 SENSING SOUR	CES FROM 65 TO 3000 KM		
	(AE-C -13) BARTH LOW		
NITRIC UXIDE AIR	LU8+ : - : : - · · · · · · · · · · · · · · ·	K 5-1905-01 IG 5-1505-01 WI	C 8 155
AE-D	(AE-D -11) BARTH		
NITRIC OXIDE AIRG	LOw	R 2.190E-01 TO 2.150E-01 MI	C BC 165
EXOS-A	(EXOS-A -03) UNKNOWN		
X-RAY AND ULTRAVI	GLET AURGRAL TELESCOPES	R 1.000E-02 TO 1.000E-04 MI	C <b>B</b> C 210
INDIAN SCIENTIFIC S	AT. (INDASAT-C3) UNKNEWN		
IONOS PHERIC ELECTI	RON TRAP AND UV		
CHAMBERS	• • • • • • • • • • • • • • • • • • • •	R 1.216E-03 TO 1.216E-03 MI	С В 247
1\$5	(ISS -02)		•
RADIO NOISE	************************************	R	C 250
SRATS	(SRATS -03) TOHMATSU		
GEOCORONAL ULTRAV	IOLET GLOBALLERON	A	8 331

RANGE OF MEASUREMENTS

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERÎMENT TITLE	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX REGION PLANET * MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
1.3.3 SENSING MAGNETOSPHERIC SCURCES ABOVE 3000 KM	•
EXPLORER 43 (71-019A-12) KELLEGG ELECTROSTATIC WAVES AND RADIO NOISE	A 2.300E 01 TO 2.000E 05 HZ DEFGH 65
DAUGHTER (DAUGHTR-06) HARVEY RADIG PROPAGATION RECEIVER	R 3.000E 08 TO 3.000E 08 HZ B GH 199
MOTHER — OE) HARVEY IMPEDANCE PROBE AND RADIO PROPAGATION TRANSMITTER	R 3.000E 08 TC 3.000E 08 HZ DEFGH 285

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SATELLITE NAME DESCRIPTIVE	EXPERIMENT IO EXPERIMENTER EXPERIMENT TITLE	RANGE OF MEASUREM MIN VALUE (F OR E) * MAX VALUE (LAMBDA)	MAX	REGION		
1.3.4 SENSING INTERPL	ANETARY SPACE					
HELIUCENT RI C						
20-HZ TO 1-KHZ MAGNE 10)-KHZ ELECTRIC FIE	TIC AND 20-HZ TO LO DETECTORS	A 2.000E 01 TO 1.000E 03	HZ	н		237
• ==	(71-019A-12) KELLOGG	A 2.300E 01 TG 2.000E 05	4.7	DEFGH		65
ELECTRUSTATIC WAVES	AND RADIO NOISE	A 24300E 01 10 21000E 03	nz.	DEFOR		0.5
	(ATS-F -09) DAVIES	R 4.000E 07 TO 3.600E 08	вни	в н		193
	(65-105A-C4) ESHLEMAN RECEIVER	R 4.980E 07 TO 4.230E 08	HZ.	н		5
	(DAUGHTR-C6) HARVEY					
DAUGHTER RADIO PROPAGATION RE	CEIVER	R 3.000E 08 TD 3.000E 08	н	в Gн		199
	(MCTHER -08) HARVEY					
IMPEDANCE PROSE AND F	RADIO PROPAGATION	R 3.000E 08 TC 3.000E 08	HZ	DEFGH		285
	(72-012A-06) JUDGE	7 7 000F 00 TO 0 000F 00		н	5	53
ULTRAVIOLET PHOTOMET	RY	R 8.000E-02 TO 2.000E-02	. M.T.C	н	э	33
	(73-019A-06) JUDGE RY	R-8.000E-02 TO 2.000E-02	MIC	, н	5	134
	Y (MARINJ -02) HEWARD					267
S- AND X-BAND RACIO	PROPAGATION	R		н	12	267

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	RANGE OF MEASUREMENTS	
SATELLITE NAME EXPERIMENT 1D EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (F OR E) MAX REGION	PLANET I/012345M PAGE
1.3.5 SENSING COLD (PLANETARY) SQURCES		
NIMBUS-F (NIMBS-F-05) HOUGHTON PRESSURE-MODULATED RADIOMETER (PMR)	R A	3 . 293
FIONEER VENUS PROBE A (PIC78PA-06) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	R	2 302
PIGNEER VENUS PROBE E (FIG76P8-CS) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE		
INTERFEROMETRIC TRACK IN G	R	2 306
PIONEER VENUS PROBE C (PIO78PC-03) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE		
INTERFERCMETRIC TRACKING	R	2 308
PIONEER VENUS PROBE C (FIG78PD-03) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	R	ž 310
FIONEER VENUS PROBE E (PIO78PE-03) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE		
INTERFER CMETRIC TRACK ING	R	. 2 312
NIMBUS 5 (72-097A-0A) WILFEIT, JR. ELECTRI CALLY SCANNING MICROWAVE		
RADIGMET ER (ESMR)	R 1.935E 10 TO 1.935E 10 HZ A	3 129
NIMBUS 5 (72-097A-03) STAELIN NIMBUS-E MICROWAVE SPECTROMETER (NEMS)	R 2.222E 10 TO 6.438E 10 HZ A	3 129
NIMBUS-F (NIMBS-F-10) STAELIN SCANNING MICROWAVE SPECTROMETER (SCAMS)	R 2.222E 10 TO 6.522E 10 HZ A	3 294
NIMBUS-F (NIMBS-F-03) WILHEIT, JR.		
ELECTRICALLY 5 CANNING MICROWAVE RADIOMETER (ESMR)	R 3.700E 10 TO 3.700E 10 HZ A	3 291
ITOS-H (ITOS-H -02) NESS STAFF Tiros operational vertical sounder		
(TOVS)	R 5.455E 10 TG 5.455E 10 HZ A	3 258
TITOS-I (1105-1 - C2) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER		7 044
(TOVS)	A 2045DE IO IO 5045DE IO MZ A	3 261
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 5.455E 10 TO 5.455E 10 HZ A	3 263
TIROS-N (TIROS-N-02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER		
(TOVS J	R 5.455E 10 TO 5.455E 10 HZ A	3 335

SATELLITE NAME EXPERIMENT 1D EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX REGION F MAX VALUE (LAMBDA) MIN ABCDEFGHI/01	LANET 2345M PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES		
NIMBUS-F (NIMBS-F-05) SMITH EARTH RADIATION BUCGET (ERB)	R 5.000E 01 TO 2.000E-01 MIC A	3 292
MARINER-J VENUS/MERCURY (MARINJ -06) CHASE, JR. TWO-CHANNEL IR RADIOMETER	R 3.900E 01 TO 2.200E 01 MIC 1	2 268
ITOS-H (ITOS-H -02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER		
(TOVS)	R 3.000E 01 TO 3.500E 00 MIC A	3 258
ITOS-I (ITOS-1 -02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	P 3-000F 01 TO 3-800F 00 MIC A	3 261
ITOS-J (ITOS-J -02) NESS STAFF	R 3000E 01 10 3000E 00 MIC R	5 201
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	R 3.000E 01 TG 3.800E 00 MIC A	3 263
TIROS-N (TIROS-N-02) NESS STAFF TIROS OPERATIONAL VERTICAL SOUNDER		
(TOVS)	R 3.000E 01 TO 3.800E 00 MIC A	3 335
PIONEER VENUS PROEE E (PIO78P8-05) SUOMI INFRARED RACIOMETER	A 3.000E 01 TO 2.000E-01 MIC	2 305
NIMBUS-F (NIMBS-F-04) GILLE Limb radiance inversion radiometer		
(LRIR)	R 2.500E 01 TO 8.800E 00 MIC A	3 292
NIMBUS 5 (72-097A-01) SMITH INFRARED TEMPERATURE PROFILE RADIOMETER		
(IT PR)	R 2.200E 01 TO 1.100E 01 MIC A	3 128
NIMBUS 5 (72-097A-02) HOUGHTON SELECTIVE CHOPPER RACIOMETER (SCR)	R 2.000E 01 TO 8.000E 00 MIC A	3 128
NUAA 2 (72-0824-04) NESS STAFF VERTICAL TEMPERATURE PROFILE RADIOMETER		
(VTPR)	R 1.870E 01 TO 1.200E 01 MIC A	3 119
ITOS-F (1TOS-F - 04) NESS STAFF VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	R 1.870E 01 TO 1.200E 01 HIC A	3 253
ITOS-G (ITOS-G -04) NESS STAFF VERTICAL TEMPERATURE PROFILE RADIOMETER	-	
(YT PR)	R 1.870E 01 TO 1.200E 01 MIC A	3 256
MARINER-J VENUS/MERCURY (MARINJ -06) CHASE, JR. TWO-CHANNEL IR RADIOMETER	R 1.700E 01 TO 1.000E 01 MIC	.2 268
NIMBUS 4 (70-025A-10) HOUGHTCN SELECTIVE CHOPPER RADIOMETER (SCR)	R 1.500E 01 TO 1.450E 01 MIC A	3 46

	RANGE OF MEASUREMENTS	
SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	PLANE (F OR E) MAX REGIDN PLANE * MAX VALUE (LANGUA) MIN ABCDEFGHI/012345	
1.3.5 SENSING COLT (PLANETARY) SOURCES	,	
NIMBUS+F (NIMBS-F-02) MCCULLOCH		
HIGH-RESQLUTION INFRARED RADIATION SOUNDER (HIRS)	R 1.500E 01 TU 6.900E-01 MIC A 3	291
ERTS-B (ERTS-B -02) UNKNOWN MULTISPECTRAL SCANNER (MSS)	R 1.260E 01 TO 1.040E 01 MIC A 3	204
NOAA 2 . (72-082A-02) NESS STAFF		204
SCANNING RADIOMETER (SR)	R 1.250E 01 TC 1.050E 01 MIC A 3	117
NDAA 2 (72-082A-03) NESS STAFF VERY HIGH RESOLUTION RADIOMETER (VHRR)	R 1.250E 01 TO 1.050E 01 MIC A 3	118
ATS-F (ATS-F -08) SHENK GEOSYNCHRONOUS VERY HIGH RESOLUTION		
RADIOMETER (GV HRR)	R 1.250E 01 TO 1.050E 01 MIC A 3	193
ITOS-F (ITOS-F-02) NESS STAFF SCANNING RADIOMETER (SR)	R 1.250E 01 TO 1.050E 01 MIC A 3	252
ITOS-F (ITOS-F -02) NESS STAFF VERY HIGH RESOLUTION RADIOMETER (VHRR)	P 1 2505 01 TO 1 0505 01 H14	
ITOS-G (ITOS-G -02) NESS STAFF	R 1.250E 01 TO 1.050E 01 MIC A 3	252
SCANNING RADIOMETER (SR)	R 1.250E 01 TO 1.050E 01 MIC A 3	255
ITOS-G (EO-G-O-3) NESS STAFF VERY HIGH RESOLUTION RADIOMETER (VHRR)	R 1-250E 01 TO 1-050E 01 MIC A 3	256
SMS-A (SMS-A -01) NESS STAFF VISIBLE-INFRARED SPIN-SCAN RACIOMETER		
(VISSR)	R 1.250E 01 TO 1.050E 01 MIC A 3	321
SMS-B (SMS-B -04) NESS STAFF VISIBLE-INFRARED SPIN-SCAN RADIOMETER		
SMS-C (SMS-C -01) NESS STAFF	R 1-250E 01 TO 1-050E 01 MIC A 3	325
VISIBLE-INFRARED SPIN-S CAN RADIOMETER (VISSR)	R 1.250E 01 TO 1.050E 01 MIC A 3	327
GUES-B -01) UNKNOWN	,	321
VISIBLE-INFRAREC SPIN-SCAN RADIOMETER (VISSR)	R 1.250E 01 TG 1.050E 01 MIC A 3	215
GDES-C (GDES-C -01) NESS STAFF VISIBLE-INFRARED SPIN-SCAN RADIOMETER		
(VISSR)	R 1.250E 01 TO 1.050E 01 MIC A . 3	.218
NIMBUS 5 (72-097A-08) MCCULLCCH Temperature/Humidity infrared radiometer		
(THIR):	R 1.250E 01 TO 6.500E 00 MIC A	130

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SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MEASUREMENTS VIN VALUE (F OR E) MAX REGION * MAX VALUE (LAMBDA) MIN ABCDEFGHIA	PLANET 012345M PAGE	i.
1.3.5 SENSING COLD (PLANETARY) SQURCES	•		
ITOS-H (ITOS-H -01) NESS STAFF ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	R 1.250E 01 TO 7.500E-01 MIC A	3 258	}
ITOS-I (ITOS-I -01) NESS STAFF ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	R 1.250E 01 TO 7.500E-01 MIC A	3 260	D
ITOS-J (ITGS-J -01) NESS STAFF ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	R 1.250E 01 TC 7.500E-01 MIC A	3 263	3
TIROS-N (TIROS-N-01) NESS STAFF ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	R 1.250E 01 TO 7.500E-01 MIC A	3 334	4
NIMBUS-F (NIMBS-F-12) BANDEEN TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR)	R 1.200E 01 TG 6.500E 00 MIC A	3 294	4
ERTS 1 (72-058A-02) UNKNEWN MULTISPECTRAL SCANNER (MSS)	R 1.100E 00 TO 5.000E-01 MIC A	3 10	4
ERTS-8 (ERTS-8 -02) UNKNOWN MULTISPECTRAL SCANNER (MSS)	R 1.100E 00 TO 5.000E-01 MIC A	3 20	4
PICNEER VENUS PROBE E (PIO78PB-02) BLAMONT CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	A 9.000E-01 TO 9.000E-01 MIC	2 30	4
PIGNEER VENUS PROEE C (PIO78PC-C2) ELAMENT CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	A 9.000E-01 TO 9.000E-01 MIC	2 30	8
FI ONEER VENUS PROBE D (PIO78PD-02) BLAMONT CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	A 9.000E-01 TO 9.000E-01 MIC	2 31	O
PICNEER VENUS PROEE E (PIO78PE-02) BLAMONT CLOUD EXTENT, STRUCTURE AND DISTRIBUTION	A 9.000E-01 TO 9.000E-01 MIC	2 31	1
ERTS 1 (72-058A-01) WEINSTEIN RETURN BEAM VIDICON (RBV) CAMERA SYSTEM	R 8.300E-01 TO 4.750E-01 MIC A	3 10	3
ERTS-E (ERTS-8 -01) WEINSTEIN RETURN BEAM VIDICON (RBV) CAMERA SYSTEM	R 8.300E-01 TO 4.750E-01 MIC A	3 20	:3
PIONEER VENUS PROBE B (PIOT8PB-07) TOMASKO Solar Energy Penetration into the Atmosphere	R 8.000E-01 TQ 3.000E-01 M1C	2 30	5
PIONEER VENUS PROBE E (PIO78PB-CE) WEINMAN	•		

	CATELLITE NAME			4G€ OF		HENTS		
	SATELLITE NAME	EXPERIMENT ID EXPERIMENTER	MIN	VA LUE	(F OR E)	MAX	REGION PLANET	
	DESCRIPTIVE	EXPERIMENT TITLE	* MAX	VALUE	(I AMBDA)	MITN	ABCDEFGHI/012345M	~ =
					'Enmoun'	14 7 14	MECDEL GHILATS 342M	PAGE
	1.3.5 SENSING COLD (PL	ANET ARY ) SOURCES						
	SPIN-SCAN PHOTOMETER.							
	or any source in the same tent	**************************	R 8.0	000E-01 1	TO 3.000E-01	MIC	2	306
	GOES-C	ICCEO A MAN CONTRACTOR						
		(GCES-C -C1) NESS STAFF						
	VISIBLE-INFRARED SPIN	-SCAN RADIOMETER			,			
	(VI22K)**********	**********************	R 7.5	00E-01 T	0 5.550E-01	MIC	А з	218
							7	210
	G0E5-B	(GDES-B -01) UNKNOWN						
	VISIBLE-INFRARED SPIN	-SCAN RADIOMETER					•	
	(VISSR)	**********************					_	
			K /+5	000E-01 I	0 5.500E-01	WIC	A 3	215
	ATS-F	(ATS-F -08) SHENK						,
	GEOSYNCHRONOUS VERY H	TOP RECOLUTION						
	PARTIMETED (CUMPO)	146 KESOEGITUM						
	MANAGED OF TOAKKISS	*************************	R 7.5	00E-01 T	0 5.500E-01	MIC	A 3	193
	SMS-4						-	
		(SMS-A -01) NESS STAFF						
	VISIBLE-INFRARED SPIN	-SCAN RADIOMETER						
	(VISSR)	************************	B 7.5	00E-01 T	0 5.500E-01	MIC		
					0 0400C-01	M1 C	А 3	321
	SM5~8	(SMS-B -04) NESS STAFF						
	VISIBLE-INFRARED SPIN-	-S CAN RADIGMETER						
	(VISSR)	***********						
		*******************************	R /+5	00F-01 1	0 5.500E-01	MIC	E A	325
	SMS-C	ISHS-F WAS USED ATION						
		(SMS-C -01) NESS STAFF						
£n	VISIBLE-INFRARED SPIN-	-SCAN RADIOMETER						
521	£4122K1 *********	•••••••••	R 7.5	00E-01 T	0 5.500E-01	MIC	А з	327
-			*					JE!
	NOAA 2	(72-082A-02) NESS STAFF					•	
	SCANNING RADIOMETER (S	SR }	P 7.3	00E-01 T	0 5.200E-01			
	,			001 0. 1	0 342006-01	MIC	A 3	117
	NOAA 2	(72-082A-03) NESS STAFF						
	VERY HIGH RESOLUTION R	RADIOMETER (VHRR)	6 7 7		<b></b>			
			R 7.31	00E-01 T	0 5.200E-01	MIC	А з	118
	ITOS-F	/ TTGS E AAA NEGS AT45-						
		(ITOS-F -02) NESS STAFF						
	SCHULING KADIOMETER (S	SR }	R 7.3	00E-01 T	0 5.200E-01	MIC .	А з	252 .
	1700 0						_	
	ITOS-F	(ITOS-F -03) NESS STAFF						
	VERY HIGH RESOLUTION F	RACIOMETER (VHRR)	R 7.3	00E-01 T	0 5.200E-01	MIC.	A 3	250
				<b>-</b>	• •••••••••••••••••••••••••••••••••••••		, ,	252
	ITOS-G	(ITOS-G -02) NESS STAFF						
	SCANNING RADIOMETER (S	R )	P 7.30	10E_01 T	5.200E-01		_	
			, •5,	000-01	D 24500E+01	WIC	4 3	255
	ITOS-G	(ITOS-G -03) NESS STAFF						
	VERY HIGH RESOLUTION &	ACIOMETER (VHRR)		<b>.</b>				
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	CONTROL CANCEL CANCEL CONTROL	R 7.30	00E-01 T	5.200E-01	MIC /	. з	256
	ITOS-H .	1 *** OF 1						
		(ITOS-H -01) NESS STAFF						
	ADVANCED VERY HIGH RES	OFOLION						
	KADIUMEIER (AVHER)	************	R 7.00	0E-01 TO	5.000E-01	MIC:	` <u>a</u>	258
					· - · •	,	•	200
	1-SDT 1	(ITOS+I -QI) NESS STAFF						
	ADVANCED VERY HIGH RES	OLUT ION					7	
	RADIOMETER (AVHRR)	••••••	R 7-00	10F-01 TO	1 R.000===	410	_	
					, 24000E=01	WILE !	3	260
	ITOS-J	(ITOS-J -O1) NESS STAFF		,				
		The same of the sa						

RANGE OF MEASUREMENTS

SATELLITE NAME DESCRIPTIVE	EXPERIMENT ID EXPERIMENTER E X P E R I M E N T T I T L E	RANGE OF FIN VALUE () * MAX VALUE ()		REGION PLANET ABCDEFGHI/012345	
1.3.5 SENSING COLD (P	LANETARY) SOURCES				
ADVANCED VERY FIGH R RADIOMETER (AVHRR)	ESOLUTION	R 7.000E-01 TO	5.000E-01 MIC	а 3	263
TIRCS-N ADVANCED VERY HIGH R RADIOMETER (AVHRR)	(TIROS-N-G1) NESS STAFF ESOLUTION	R 7.000E-01 TD	5.000E-01 MIC	: д 3	334
ESSA 8 AUTOMATIC PICTURE TR SYSTEM	(68-114A-01) NESS STAFF ANSMISSION (APT)	R 6.500E-01 TO	4.500E-01 MIC	: А 3	23
NIMBUS 4 BACKSCATTER ULTRAVIO SPECTROMETER	(70-025A-05) HEATH	я 3.400E-01 TO	2.500 E-01 MIC	: Д	44
VIKING-A ULTRAVIOLET PHOTOMET	(VIKNG-A-12) BARTH	R 3.400E-01 TO	2.500E-01 MIC	0 4	346
VIKING-B ULTRAVIOLET PHOTOMET	(VIKNG-B-12) BARTH	R 3.400E-01 TO	2.500E-01 MIC	. 0 4	353
PIONEER VENUS PROBE A ULTRAVIOLET SPECTREM	(PIO78PA-05) STEWART	A 3.400E-01 TO	1.100E-01 MIC	2	302
	RY (MARINJ -05) ERCACFCCT	R 1.657E-01 TO	4.750E-02 MI	CA I 123	268
VIKING-A IR SPECTROMETER W	(VIKNG-A-D3) FARMER VATER VAPOR MAPPING	R 7.000E-04 TO	3.000E-04 M14	c <b>4</b>	341
VIKING-E IR SPECTROMETER W	(VIKNG-8-C3) FARMER VAPOR MAPPING	R 7.000E-04 TO	3.000E-04 MI	c <b>4</b>	348
MARINER 77 A TV PHOTOGRAPHY •••••	(MARN77A-01) SMITH	R 5.100E-04 TO	4.140E-04 MI	c 5	270
MARINER 776 TV PHOTOGRAPHY	(MARN778-01) SMITH	R 6.100E-04 TO	4-140E-04 MI	c 5	276
MARINER 77A TV PHOTOGRAPHY	(MARN77A-C1) SMITH	R 6.100E-04 TO	4.140E-04 MI	с	270
MARINER 778 TV PHUTGGRAPHY	(MARN77B-C1) SMITH	R 6.100E-04 TG	4.140E-04 MI	c	276
X-4 HIGH-RESOLUTION MUL RADIOMETER	(X-4 -01) UNKNEWN Tichannel infrared	R		А 3	355
MARINER-J VENUS/MERCU S- AND X-BAND RACIO	RY (MARINJ -02) HOWARD PROPAGATION	R		H 12	267

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SATELLITE NAME DESCRIPTIVE	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	RANG Min * Max		MEASUREN (F OR E) (LAMBDA)	MAX	REGION ABCDEFGHI/	PLANET 012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES								
EARTH ALBECO RADIOMET	ER	R				A	3	355

		EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE			REGION PLA Nabcdefghi/0123	
	1.3.6 SENSING THE SUN					
	HELIUS-B GALACTIC AND SOLAF COS	(HELID-8-CE) TRAINCE	R		o	231
	HELIOS-A GALACTIC AND SOLAR COS	(HELIO-A-08) TRAINOR	R		0	226
	HELIOS-A SOKHZ-2MHZ RADIO WAVE	( HEL IO-A-06) GURNETT	R 1.000E 01 T	0 1.000E 05 HZ	o	225
	HELIOS-B 50KHZ-2MHZ RADIO WAVE	(PELIG-8-06) GURNETT	R 1.000E 01 T	D 1.000E 05 HZ	o	230
	HELIOCENTRIC 20-KHZ TO 3-MHZ RACIO	( MELOCTR-10) STEINBERG	R 2.000E 04 T	0 3.000E 05 HZ	o	238
	EXPLURER 49 RAPID-BURST RECEIVERS	(73-039A-02) STONE	R 2.500E 04 T	0 <b>1.6</b> 00E 07 HZ	1 0	141
	EXPLORER 49 STEP FREQUENCY RADIOMS	(7:3-039A-01) STONE ETERS	R 3.000E 04 T	0 2.000E 07 HZ	1 0	140
	HELIOS-A 50KHZ-2MHZ RADIO WAVE	(FEL IO-A-06) GURNETT	R 5.000E 04 T	0 2.000E 06 HZ	o	225
) }	HELIOS-8 50KHZ-2MHZ RADIO WAVE	(HELIO-6-06) GURNETT	R 5.000E 04 T	D 2.000E 06 HZ	o	230
	EXPLORER 43  INTERPLANETARY LONG-WI ASTRONOMY EXPERIMENT.	(71-019A-13) HADDOCK AVELENGTH RADIO	R 5.000E 04 T	O 3.500E 06 HZ	0	65
	ISIS 1 COSMIC RADIO NOISE	(69-009A-10) HARTZ	R 1.000E 05 T	0 2.000E 07 HZ	0	29
	ISIS 2 COSMIC RADIO NCISE	(71-024A-10) HARTZ	R 1.000E 05 T	8 2.000€ 07 HZ	o	72
	SKYLAB WHITE LIGHT CORONAGRA	(73-027A-04) MACQUEEN Ph	R 7.000E 03 T	O 3.500E 03 A	0	138
	OSO 7 WHITE-LIGHT CORONOGRAM ULTRAVIOLET CORONOGRAM	(71-083A-02) TOUSEY PH AND EXTREME PH	R 6.500E 03 T	O 3.900E O3 A	0	81
	OSO-I CHROMOSPHERE FINE STRU	(OSO-I -02) LEMAIRE UCTURE STUDY	R 4.000E 03 T	0 1.000E 03 A	0	296
	VIKING-A ULTRAVIOLET PHOTOMETR	(VIKNG-A-12) BARTH	R 3.400E 03 T	0 2.500E 03 A	0	4 346
	VIKING-8 ULTRAVIOLET PHOTOMETR	(VIKNG-8-12) BARTH	R 3.400E 03 T	O 2.500E 03 A	0	4 353

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SATELLITE NAME. DESCRIPTIVE	EXPERIMENT IO EXPERIMENTER E X P E R I M E N T T I T L E	M		VALUE	(F (		MAX	REGION ABCDEFGHI			
1.3.6 SENSING THE SUN											
NIMBUS 4 SQLAR UV MONITOR	(70-025A-01) HEATH	R 3	<b>.</b> 300	E 03 T	0 1.1	150 E 0 3	A		o	44	
HIGH-RESOLUTION ULTRA	(USO-I -01) BRUNER, JR. VIOLET SPECTROMETER	R 2	• 20 O	F 03 T	.n. 1r	NSOF 03	ı A		0	296	
AE-C	(AE-C -06) HINTEREGGER									230	
SOLAR EUV SPECTROPHOT	UM ET ER	R 1	-850	E 03 T	ra 1.4	120E 02	A		0	150	
AE-D SOLAR EUV SPECTROPHOT	(AE-D -06) HINTEREGGER	R I	•850i	E 03 7	ro 1.4	120E 02	: <b>A</b>		0	161	
AE-E SOLAR EUV SPECTROPHOT	(AE-E -06) HINTEREGGER JMETER	R 1	. 850	E 03 T	ro 1.4	120E 02	A		0	171	
EXPLORER 44 SOLAR RADIATION DETEC	(71-058A-01) KREPLIN	R 1	.6008	E 03 T	0 8.0	100E-02	A		0	75	
EXPLORER 37 SGLAR RADIATION DETECT	(68-017A-01) KREPLIN	R I	•350i	≣ 03 T	0 1.0	80E 03	A		0	16	
	(73-027A-06) GOLDBERG						,		•		
	HEL IOMETER	R 1.	3508	0 <b>3 T</b>	0 2.9	60E 02	A		0	139	
SKYLAB UV SCANNING POLYCHROMATOR/SPECTRO	(73-027A-cs) GOLDBERG	R 1.	3508	: 03 T	n 2.9	60E 02	Δ		۵	139	
OS O-I	(050-1 -08) WELLER, JR.					•••			•	139	
EUV FROM EARTH AND SPA	CE	R 1.	230E	03° T	0 1.5	008 02	A		0	298	
AE-C . SOLAR EUV FILTER PHOTO	(AE-C -05) HEATH	R 1.	216E	03 Т	0 4.5	00E 01	A		o .	149	
AE-D SOLAR EUV FILTER PHOTO	(AE-D -05) HEATH	R 1.	2166	: 03 T	0 4.5	00E 01	A		o	161	
	(AE+E +OE) HEATH METER	R 1.	216E	: 03 Т	D <b>4.</b> 5	00E 01	A		0	171	
	(AE-C -05) HEATH.	R 1.	215E	: 03 T	0 4.5	00E 01	A		o	149	
AEROS-E FLUX AND SPECTRAL DIST											
	AND SPATIAL VAR	R 1.	.070E	03 T	0 3.0	00E 02	A	•	O .	179	
OSO 7 WHITE-LIGHT CORDNOGRAP ULTRAVIOLET CORONOGRAP	(71-083A-02) TOUSEY H AND EXTREME	R 5.	.500F	02 1	0 1.7	00E 02	Δ.		o	81	
									•	91	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER	RANGE OF MEASUREMENTS Min value (f or E) Max region planet
DESCRIPTIVE EXPERIMENT TITLE	# MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
1.3.6 SENSING THE SUN	
AEROS-8 (AEROS-B-04) SCHMIDTKE FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR	R 5.100E 02 TO 1.500E 02 A 0 179
OSO 7 (71-083A-01) NEUPERT X-RAY AND EUV SPECTROFELIGGRAPH (2 TO 400 A)	R 4.000E 02 TO 1.700E 02 A 0 80
SKYLAB (73-027A-05) GIACCONI X-RAY SPECTROGRAPHIC TELESCOPE	R 6.000E 01 TO 3.500E 00 A 0 139
EXPLORER 37 (68-017A-01) KREPLIN SOLAR RADIATION DETECTORS	R 6.000E 01 TO 5.000E-01 A 0 16
VELA 58 (69-046E-02) CHAMBERS SGLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A. 1 TO 16 A. 44 TO 60 A	R 6.000E 01 TO 5.000E-01 A 0 34
VELA 6A (70-027A-02) CHAMBERS SULAR X-RAY DETECTORS5 TO J.O A. 1 TO 8 A. 1 TO 16 A. 44 TO 60 A	R 6.000E 01 TO 5.000E-01 A 0 48
VELA 68 (70-0278-02) CHAMBERS SOLAR X-RAY DETECTORS: .5 TO 3.0 A. 1 TO 8 A. 1 TO 16 A. 44 TO 60 A	R 5.000E 01 TO 5.000E-01 A 0 51
EXPLORER 47 (72-073A-08) KRIMIGIS PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	R 1.650E 01 TO 1.800E 00 A I 0 112
IMP-J -08) KRIMIGIS PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	R 1.650E Ó1 TO 1.800E DO A I O 244
USU 7 (71-083A-01) NEUPERT X-RAY AND EUV SPECTROFEL 10 GRAPH (2 TD 400 A)	R 1.500E 01 TO 8.000E 00 A 0 80
QV5-6 (69-0468-01) YATES GEIGER-MUELLER TUBE, SOLAR X-RAY DETECTUR, 2 TO 12 A	R 1.200E 01 TO 2.000E 00 A 0 30
GOES-B (GOES-B-03) WILLIAMS SILAR X-RAY MONITOR	R 8.000E 00 TO 5.000E-01 A 0 216
GDES-C (GDES-C -03) WILLIAMS SOLAR X-RAY MONITOR	R 8.000E 00 TO 5.000E-01 A 0 219
SMS-A (SMS-A -03) WILLIAMS SOLAR X-RAY MONITCR	R 8.000E 00 TO 5.000E-01 A 0 322
SMS-B (SMS-B -02) WILLIAMS SOLAR X-RAY MONITOR	R 8.000E 00 TO 5.000E-01 A 0 325

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	SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX REGION PLANET * MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
	1.3.6 SENSING THE SUN	
	SMS-C -03) WILLIAMS SOLAR X-RAY MONITCR	R 8.000E 00 TO 5.000E-01 A 0 328
	DSD-I (DSD-I -03) NOVICK HIGH-SENSITIVITY (RAPHITE CRYSTAL SPECTROSCORY OF STELLAR AND SOLAR V RAYS	
	SPECTROSCOPY OF STELLAR AND SOLAR X RAYS	R 6.204E 00 TO 1.551E 00 A I 0 296
	MAPPING X-RAY HELICMETER	R 6.204E 00 TO 4.136E-01 A 0 297
	OSC 7 (71-083A-05) PETERSON HARD SOLAR X-RAY MONITORING	R 6.204E 00 TO 4.136E-02 A 0 83
	QSQ 7 (71-083A-Q1) NEUPERT X-RAY AND EUV SPECTROHELIOGRAPH (2 TO 400 A)	R 2.500E 00 TO 1.700E 00 A 0 80
	HELIOCENTRIC (HELOCTR-09) ANDERSON X-RAYS AND ELECTRONS	R 1.551E 00 TO 1.723E-01 A 0 237
	UV5-6 (69-046B-02) YATES S DIUM 10DIDE SCINT LLATOR, GAMMA-RAY DETECTOR, 19 TO 1175 KEV	R 6.531E-01 TO INFINITY 0 30
527	QSU 7 (71-083A-01) NEUPERT X-RAY AND EUV SPECTROHELIDGRAPH (2 TO	R 6.531E-01 TO INFINITY 0 30
	400 A)	R 6.204E-01 TO 3.102E-01 A 0 80
	EXPLORER 37 (68-017A-01) KREPLIN SOLAR RADIATION DETECTORS	R 6.204E-01 TO 1.551E-01 A 0 16
	TD 1A (72-014A-06) DE JAGER SOLAR X-RAY MONITOR	R 5.170E-01 TO 1.379E-02 A 0 100
	INDIAN SCIENTIFIC SAT. (INDASAT-02) UNKNOWN SOLAR NEUTRON AND GAMMA RAYS	R 6-204E-02 TO 6-204E-04 A 0 247
	TD 1A (72-014A-07) LABEYRIE GAMMA-RAY MEASUREMENT	R 7.000E 01 TO 3.000E 02 MEV I 0 100
	SRATS (SRATS -01) MATSUOKA SOLAR X-RAY MONITOR	R 0 330
	SRATS (SRATS -02) OSHIC HYDROGEN LYMAN-ALPFA	R 0 330

				MEASUREM			_	
	EXPERIMENT ID EXPERIMENTER					REGION PLANE		
PESCRIPTIVE	EXPERIMENT TITLE	* MAX VAL	UE (L	AMBDA)	MIN	ABCDEFGH1/012345	мр	PAGE
1.3.7 SENSING HOT (STA	R) SOURCES							
MARINER 77A	(MARN77A-11) LILLIE							
MULTIFILTER PHOTOPOLA	RIMETER.							
2200-7300 A	******************************	R				5		275
MARINER 77E	(MARN778-11) LILLIE							
MULTIFILTER PHOTOPOLA								
	************************	R				5	;	281
•			*					
MARINER 77A	(MARN77A-11J LILLIE							
MULTIFILTER PHOTOPOLA		R				5		275
2200-7300 A	*************	R				ď		
MARINER 778	(MARN778-11) LILLIE							
MULTIFILTER PHOTOFCLA		_				_		201
2200-7300 A		R				5		261
MARINER 77A	(MARN77A-02) ESHLEMAN							
COHERENT 5- AND X-BAN	C TRANSMITTER AND							
	***************************************	R 0.000E-3	39 TO 1	NFINITY		5	i	271
QAQ 3	(72-065A-02) BOYD							
	***********************	R 5.000E	02 TO 1	.000E 18	HZ	1		108
	AMADAMINA ADA MADWICK							
MARINER 77A SWEEP FREQUENCY (.02	(MARN77A-10) WARWICK							
	10 ~ 0 MML/ NADEO	R 2.000E 0	04 TC 4	.050E 07	HZ	5		275
MARINER 778	(MARN778-10) WARWICK							
SWEEP FREQUENCY (.02	10 40 MMZ) RADIO	R 2.000E 0	04 TO 4	.050E 07	HZ	5	,	281
ACC LITER ** ** * * * * * * * * * * * * * * * *						_		-
EXPLORER 49	(73-039A-02) STONE			4445 5-	:			
RAPID-BURST RECEIVERS	***************************************	R 2.500E (	04 70 1	.600E 07	HZ	I 0		141
EXPLORER 49	(73-039A-01) STONE							
STEP FREQUENCY RADIOM	ETERS	R 3.000E 0	04 TO 2	.000E 07	ΗŻ	1 0		140
MADINEC 775	(MARN77B-02) ESHLEMAN							
MARINER 77E COHERENT S- AND X-BAN	,							
S-BAND RECEIVER	224 244 25 21 1 CC MIN	R 1.000E	09 TC 1	1.000E 10	HZ		5	277
MARINER 77A	LIBRAH (EO-ATTURAM)	D = 4005	AE TO 1	2 0005 01				271
INFRARED SPECTROSCOPY	AND RADIOMETRY	K 5.000E (	us (D 3	3-4000 04	A	•	,	211
MARINER 778	(MARN778-03) HANEL							
INFRARED SPECTROSCOPY	AND RADIGMETRY	R 5.000E	05 TO 3	3.000E 04	. A	•	5	277
ANS	(ANS -01) VANDUINEN							
UV TELESCOPE		R 3.295E	03 TO 1	1.500E 03	A	1		181
TO 1A	(72-014A-01) HOUZIAUX	D 2.750F	ሰቼ ቸው የ	1.350F 03	•	I		98
STELLAR UV RADIATIEN	EXPERIMENT	R E . / 30C	JJ 14 1	-33VE U3		•		

SATELLITE NAME DESCRIPTI	EXPERIMENT ID EXPERIMENTER VEEXPERIMENT TITLE	RANGE OF MEASUREMENTS MIN VALUE (FOR E) MAX REG * MAX VALUE (LAMBDA) MIN ABO	ION PLANET Defghi/012345m	PAGE
1.3.7 SENSING HOT	(STAR) SOURCES			
	(72-014A-02) RCMETER	D 2 1555 02 TO 3 2545 AT 4		
	(MARN77A-04) BROADFOOT	* ******		98
ULTRAVIOLET SPEC	TRGS COPY	A 20 3000.4 DT E0 3008.1 R	5	272
MARINER 77 E ULTRAVIOLET SPEC	(MARN778-04) BROACFOOT TROSCOPY	R 1.800E 03 TD 4.000E 02 A	<b>5</b>	278
MARINER-J VENUS/ME	RCURY (MARINI -05) BROADFOOT		I 123	268
GAD 3 HIGH-RESOLUTION	(72-066A-01) SPITZER TELESCOPES	R 3.275E 02 TO 7.100E 02 A	<b>I</b>	108
	(ASTP -04) FRIEDMAN OBSERVATIONS	R 1.241E 02 TO 1.241E 01 A		184
	(FELOS - 02) UNKNOWN C X-RAY PACKAGE	R 1.241E 02 TO 6.204E 00 A	r	240
OSG-1 SOFT X-RAY BACKG INVESTIGATION		R 8,272E 01 TO 2.757E-01 A	1	297
Л SAS-C	(SAS-C -04) CLARK CONTOURS OF THE GALAXY		1	315
	(UK-5 -01) BOYD OSMIC X-RAY WITH A FOF	D.A. 1745 OL. TO A. 1747 OL.		
SAS-C	(5AS-C -03) CLARK	K 4-130E UI IU 4-135E-01 A		336
SCD X-1	FLUCTUATION MONITOR OF	R 3.102E 01 70 1.551E-01 A	1	314
CONTINUOUS X-RAY	(SAS-C -03) CLARK FLUCTUATION MONITUR OF			
SCO X-1	******	R 3-102E 01 TO 1-551E-01 A	1	314
PROPAGATION CHAR	(72-073A-GE) KRINIGIS ACTERISTICS OF SOLAR (RONS	R 1.650E D1 TD 1.800F OD A		112
IMP-J	(IMP~J -0E) KRIMIGIS ACTERISTICS OF SOLAR			- + -
	FRONS	R 1.650E 01 TG 1.800E 00 A	0 1	244
EXPLORER 42 ALL-SKY X-RAY SUR	(70-107A-01) GIACCONI	R 1.241E 01 TO 1.241E 00 A	ī	55
EXPLORER 42 ALL-SKY X-RAY SUR	(70-107A-01) GIACCONI	F 1.241E 01 TO 6.204E-01 A	1	55
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	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	MIN VALUE		MAX REGION	PL AN ET HI/012345M	PAGE
1.3.7 SENSING HOT (ST	R) SCURCES					
OSO 7 COS MIC X-RAY SOURCES 1.5 TO 9 A	(71-083A-64) CLARK In the range	R 1.241E 01 T	TO 2.068E-01	. <b>A</b>	ī	82
VELA 58 COSMIC RAYS	(65-C46E-06) CONNER	R 1.200E 01 1	TO 1.200E 01	. A	ı	36
EXFLORER 44 ALL-SKY X-RAY SURVEY	(71-058A-02) KREPLIN	R 1.200E 01 7	ro 5.000E-01	<b>A</b>	1	76
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SAS-C ANALYSIS UF GALACTIC	(SAS-C -02) CLARK X-RAY SDURCES	R 6.893E 00	TO 1.551E 00	) A	I	314
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UK 5 HIGH-RESOLUTION SOUR	(UK-5 -G3) BGYD CE SPECTRA	R 6.204E 00	TO 4.136E-0	1 A	1	337
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MEASUREMENTS

RANGE OF

SATELLITE NAME EXPERIMENT TO EXPERIMENTER	RANGE OF MEASUREMENTS MIN VALUE (FOR E) MAX REG	ION PLANET
DESCRIPTIVE EXPERIMENT TITLE		DEFGHI/012345N PAGE
1-3-7 SENSING HOT (STAR) SOURCES		•
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LOW-ENERGY X-RAY EXPERIMENT	R 4.000E 00 TO 2.000E DO A	1 182
OSD 7 (71-083A-03) PETERSEN		
COSMIC X-RAY EXPERIMENT	R 1.241E 00 TO 4.136E-02 A	I - 82
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HIGH-ENERGY CELESTIAL X RAYS	R 1.241E 00 TC 1.241E-02 A	1 258
UK 5 (UK-5 -05) ELLICTT		-
HIGH-ENERGY COSMIC X-RAY SPECTRA	R 6.204E-01 TC 6.204E-03 A	I 338
VELA 5A (69-046D-08) KLEBESADEL		
GAMMA~RAY ASTRONOMY«»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»»	R 6+204E-02 TO 1+241E-02 A	I 33
VELA 6A (70-027A-08) KLEBE SADEL		
GAMMA-RAY ASTRONOMY	R 4-136E-02 TO 8-272E-03 A	I 50
VELA 6B (7C-0278-CE) KLEBESACEL		•
GAMMA-RAY ASTRONOMY	R 4.136E-02 TO 8.272E-03 A	I 53
TD 1A (72-014A-05) OCCHIALINI Solar gamma rays in the 50- to 500-mev		
ENERGY RANGE	R 5.000E 01 TO 5.000E 02 MEV	I · 99
TD 1A (72-014A-07) LABEYRIE		
GAMMA-RAY MEASUREMENT	R 7.000E 01 TO 3.000E 02 MEV	I 0 100
ASTP (ASTP -C1) BOWYER	•	
EXTREME ULTRAVIOLET ASTRONOMY	R .	I - 183
EXDS-C (EXDS-C -01) UNKNOWN X-RAY AND GAMMA-RAY ASTRONOMICAL		
TELESCOPES	F	1 212
ASTP (ASTP -02) SOWYER		
HELIUM GLOW	R	1 183
EXOS-C (EXOS-C -02) UNKNOWN		
ULTRAVIOLET TELESCOPE	R	I 212
EXOS+C (EXOS+C -03) UNKNOWN		•
INFRARED TELESCOPE	R	I 213

ESGEO

R RANGE DF ME ASUR EMENTS E MIN VALUE (F OR E) MAK REGION SATELLITE NAME EXPERIMENT TO EXPERIMENTER 5 MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE DESCRIPTIVE EXPERIMENT TITLE 2. CHARGED PARTICLE MEASUREMENTS 2.1 SENSING ELECTRONS 2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEY) PIONEER 7 (66-075A-03) WOLFE 8 R THERMAL ENERGIES ELECTROSTATIC ANALYZER................................. (67-123A-03) ESHLEMAN PIONEER B 13 U THERMAL ENERGIES TWO-FREQUENCY BEACON RECEIVER ................... (68-100A-03) ESHLEMAN н 19 U THERMAL ENERGIES TWD-FREQUENCY BEACCH RECEIVER............... (69-009A-01) WHITTEKER ISIS 1 25 U THERMAL ENERGLES С (69-009A-02) CALVERT 26 U THERMAL ENERGIES C FIXED FREQUENCY SOUNDER ......................... (71-024A-01) WHITTEKER 67 U THERMAL ENERGIES (71-024A-02) CALVERT 1515 2 68 C U THERMAL ENERGIES (71-024A-07) BRACE 71 C U THERMAL ENERGIES CYLINDRICAL ELECTROSTATIC PROBE................... (73-039A-03) STONE EXPLORER 49 U THERMAL ENERGIES M 141 (AE-C -01) BRACE AE-C 148 U THERMAL ENERGIES ELECTRON TEMPERATURE AND CONCENTRATION......... (AE-C -04) HANSON 149 U THERMAL ENERGIES C (AE-D -04) HANSON 160 C U THERMAL ENERGIES (AE-E -O1) BRACE AE-E 169 U THERMAL ENERGIES ELECTRON TEMPERATURE AND CONCENTRATION......... (AE-E -04) HANSON 170 U THERMAL ENERGIES (AEROS-B-03) NESKE AEROS-B 179 C ELECTION CONCENTRATION IN THE IONOSPHERE ..... U THERMAL ENERGIES (DALGHTR-05) HARVEY DAUGHTER GH 199 RADIO PROPAGATION FECEIVER ....... U THERMAL ENERGIES В

(E5GEO -02) BOYD

	SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	R RANGE E MIN V		MEASUREM	ENTS MAX RE	EGTON	PLANET		,
	DESCRIPTIVE	EXPERIME	ENT TITLE			LAMBDA)			/012345M		
	2. CHARGED PARTICLE MEA	SUREMENTS	•								
	2.1 SENSING ELECTRONS	•			•			•			
	2.1.1 OF THERMAL ENERGY	IES (LESS THAN	OR EQUAL TO 1 KEY)		,				-		
	THERMAL PLASMA FLOW		••••••	R ·				F		206	
	EXOS-A ENERGETIC PARTICLE DÉT	(EXOS-A -02) ECTORS	UNKNOWN	O			8			209	
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	ISS SWEEP FREQUENCY SOUNDE	(ISS -C1)		*						248	
	ISS RETARDING POTENTIAL PR	(ISS -03)	MIYAZAKI	U THERMAI			В	<b>c</b>		249	
ı	MOTHER IMPEDANCE PROBE AND RAITRANSMITTER	(MOTHER -08) DIO PROPAGATION	HARVEY				В	DEFGH		250 265	
1	PIONEER VENUS PROBE A LANGMUIR PROBE	(PIO78PA-01)	NAGY	U THERMAL	. ENERG	1ES		н	2	300	
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,	SRATS ELECTRON TEMPERATURE	(SRATS -GE)	HIRAE	U		•	8				
ş	GRATS PLASMA DIAGNOSIS	(SRATS -06)	UNKACHA							331	
,	/IKING-A ATMOSPHERIC COMPOSITION	(VIKNG-A-C4)	NIER	U THERMAI	ENCOC					331	
6		(65-105A-04)	ESHLEMAN	U THERMAL			EV		4	341	
1	SIS 1 RADIO BEACON	(69-009A-09)	FORSYTH				. В		0	5	
A	•	(69-069A-12)	DAROSA	U THERMAL		· */		5		29	
1		(71-024A-05)	FORSYTH	U THERMAL			AB.		3	39	
Ε	SRO 4	(72-092A-C1)	BG YD	U THERMAL			Ć	-		72	
	POSITIVE ION SPECTROMET		*****************	U THERMAL			19 (	Ċ,	٠.	120	

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SATELLITE NAME EXPERIMENT ID EXPERIMENT DESCRIPTIVE EXPERIMENT TI		GE
2. CHARGED PARTICLE MEASUREMENTS		
2.1 SENSING ELECTRONS		
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO	1 KEV)	
ELECTRON TEMPERATURE AND CONCENTRATION	U THERMAL ENERGIES C 1	159
AEROS-E (AEROS-B-02) SPENNER ENERGY DISTRIBUTION OF IONS AND ELECTRONS	U THERMAL ENERGIES C	178
ATS-F (ATS-F -05) DAVIES RADIO BEACON	U THERMAL ENERGIES B H 1	193
INDIAN SCIENTIFIC SAT. (INDASAT-03) UNKNOWA IONOSPHERIC ELECTRON TRAP AND UV CHAMBERS	O THERMAL ENERGIES 8 2	247
MARINER 77E (MARN77B-G2) ESHLEMAN COMERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	U THERMAL ENERGIES 5 2	277
PIONEER VENUS PROBE A (PIOTBPA-04) KNUOSEN RETARDING POTENTIAL ANALYZER	U THERMAL ENERGIES 2	301
EXOS-A (EXOS-A -01) UNKNOWN I CNOSPHERIC PROBES	U THERMAL ENERGIES C	209
EXOS-B (EXOS-B -01) UNKNOWN MAGNETOSPHERIC PLASMA PROCE	R THERMAL ENERGIES DE	211
MARINER 77A (MARN77A-02) ESHLEMAN COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	**************************************	271
VIKING-8 (VIKNG-8-04) NIER ATMOSPHERIC COMPOSITION	U THERMAL ENERGIES 4	349
EXOS-B (EXOS-B -04) UNKNOWN MAGNETOSPHERIC PLASMA	U THERMAL ENERGIES DE	211
DAUGHTER (DAUGHTR-03) FRANK HOT PLASMA	R THERMAL ENERGIES GH	198
HAWKEYE (HAWKEYE-02) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R THERNAL ENERGIES DEF GH	222
MOTHER (MOTHER -03) FRANK HOT PLASMA	R THERMAL ENERGIES GH	283
MOTHER (MOTHER ~03) FRANK HOT PLASMA	R THERMAL ENERGIES GH	283
EXOS-8 (EXOS-8 -02) UNKNOWN		

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SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2. CHARGED PARTICLE MEASUREMENTS	
2.1 SENSING ELECTRONS	
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)	
ENERGETIC PARTICLE DETECTORS	0 1.000E 00 TC 1.000E 03 EV DE 211
AE-C (AE-C -03) DOERING	•
AE-C (AE-C -03) DOERING PHOTDELECTRON SPECTROMETER	R 2.000E 00 TO 5.000E 02 EV C 149
AE-D (AE-D -03) DOERING PHOTOELECTRON SPECTROMETER	R 2.000E 00 TO 5.000E 02 EV C 160
A5-5 (A5-5 (A3) D050 the	
AE-E (AE-E -03) DOERING PHOTOELECTRON SPECTROMETER	R 2.000E 00 TO 5.000E 02 EV B 170
MARINER-J VENUS/MERCURY (MARINJ -03) BRIDGE MEASUREMENT OF PLASMA ENVIRONMENT	R 4.000E 00 TO 4.000E 02 EV H 267
EXPLORER 43 (71-019A-11) BAME MEASUREMENT OF SOLAR PLASMA	R 4.000E 00 TO 1.000E 03 EV DEFGH 64
EXPLORER 47 (72-073A-04) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	
ELECT RONS	R 5.000E 00 TO 1.000E 03 EV GH 110
OAUGHTER (DAUGHTR-01) PASCHMANN 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE	R 5.000E 00 TO 2.000E 04 EV GH 197
HELIOCENTRIC (HELOCTR-01) BAME	
150-EV TO 7-KEV PROTON AND 5-EV TO 2-5-KEV ELECTRON PLASMA PROBE	R 5.000E 00 TO 2.500E 03 EV GH 234
IMP-J (IMP-J -04) FRANK	
MEASUREMENT OF LOW-ENERGY PROTONS AND	D E COOS DO TO E COOS DA CU
ELECT RONS	R 5.000E 00 TO 5.000E 04 EV GH 242
IMP-J -10) BAME MEASUREMENT OF SOLAR PLASMA	R 5.000E 00 TO 2.000E 04 EV GH 245
MOTHER (MOTHER -01) BAME	
50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE	R 5-000E 00 TO 2-000E 04 EV GH 282
EXFLORER 47 (72-073A-10) BAME	
MEASUREMENT OF SOLAR PLASMA	R 5.000E 00 TO 2.000E 04 EV GH 113
MOTHER (MOTHER -02) OGILVIE	
THREE-DIMENSIONAL (SIX AXIS), 6-EV TO 10-KEV ELECTRON SPECTROMETER	R 6.000E 00 TO 1.000E 04 EV DEFGH 283
APOLLC 12 LM/ALSEP (65-0990-02) SNYDER	
SOLAR WIND SPECTROMETER	R 6.000E 00 TO 1.330E 03 EV GH N 41

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2. CHARGED PARTICLE MEASUREMENTS	
2.1 SENSING ELECTRONS	•
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)	
EXPLORER 43 (71-019A-11) BAME MEASUREMENT OF SOLAR PLASMA	R 6.000E 00 TO 2.400E 04 EV DEFGH 64
VELA 6A (7C-027A-CS) BAME SQLAR WIND EXPERIMENT	R 7.500E 00 TC 1.850E 04 EV GH 49
ISIS 2 (71-024A-05) HEIKKILA SOFT-PARTICLE SPECTROMETER	R 1.000E 01 TO 1.000E 04 EV DEF 70
PICNEER 8 (67-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 12
FICNEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 18
PIONEER 8 (67-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 12
PIONEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 18
PIONEER 8 (67-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 12
PIONEER 8 (67-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 12
PIONEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1-200E 01 TO 1-000E 03 EV H 18
PIGNEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.200E 01 TO 1.000E 03 EV H 18
HELIOS-E (HELIO-B-09) ROSENBAUER PLASMA DETECTORS	R 1.600E 01 TO 1.000E 03 EV H 232
HELIOS-A (HELIO-A-09) ROSENBAUER PLASMA DETECTORS	R 1.600E 01 TO 1.000E 03 EV H 226
EXPLORER 47 (72-073A-02) BRIDGE MEASUREMENT OF SOLAR PLASMA	R 1.700E 01 TO 7.000E 03 EV GH 109
IMP-J - C2) BRIDGE MEASUREMENT OF SOLAR PLASMA	R 1.700E 01 TO 7.000E 03 EV GH 241
VELA 58 (65-046E-05) BAME	R 2.000E 01 TD 3.300E 04 EV GH 36

GH

SOLAR WIND EXPERIMENT ..... R 2.000E 01 TO 3.300E 04 EV

AE-C

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F. OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2. CHARGED PARTICLE MEASUREMENTS	
2.1 SENSING ELECTRONS	
2-1-1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)	
VELA 6A (70-027A-CE) BAME SOLAR WIND EXPERIMENT	R 2.000E 01 TO 3.300E 04 EV G 49
HEOS 2 (72-005A-02) PIZZELLA ELECTRON AND PROTON MEASUREMENTS (20	
EV-50 KEV)	R 2.400E 01 TO 1.100E 03 EV C GH 87
EXPLORER 43 (7.1-019A-05) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R 2.400E 01 TO 1.100E 03 EV H 61
DAUGHTER (DAUGHTR-02) EGIDI 50-EV TO 25-KEV ION AND 35-EV TO 7-KEV	
ELECTRON PLASMA PROBES	R 3-500E 01 TD 7-000E 03 EV GH 197
APOLLO 14 LM ALSEP (71-008C-08) D'BRIEN CHARGED PARTICLE LUNAR ENVIRONMENT	R 4.000E 01 TO 2.000E 03 EV GH 58
ATS-F (ATS-F -05) MCILWAIN AURORAL PARTICLES EXPERIMENT	R 5.000E 01 TO 5.000E 02 EV F 192
ATS 5 (69-069A-11) MCILWAIN BI-DIRECTIONAL LOW ENERGY PARTICLE	D 5 4005 04 To 4 4045 04 Tu
DETECTOR	R 6.000E 01 TO 6.000E 02 EV F 39
VELA 58 (69-046E-05) BAME SOLAR WIND EXPERIMENT	R 7.500E 01 TO 1.800E 04 EV GH 36
FIGNEER 6 (65-10 A-02) BRIDGE SOLAR WIND PLASMA FARADAY CUP	R 9.000E 01 TO 1.580E 03 EV H 4
FI ONEER 11 (73-019A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV H 137
FI ONEER 10 (7 %-01%A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV H 96
ESRO 4 (72-092A-03) HULTQUIST AURORAL PARTICLE SPECTROMETER	1.000E 02 TO 3.000E 02 EV C 121
PIONEER 11 (73-019A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV 5 137
FIGNEER 10 (72-012A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 08 EV 5 96
ESRC 4 (78-092A-03) HULTQUIST AURORAL PARTICLE SPECTROMETER	0 1.500E 02 TO 1.000E 03 EV C 121

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	SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX S MAX VALUE (LAMBOA) MIN	REGION PLANET MBCDEFGHI/012345M	PAGE
	2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)			
	HEOS 2 (72-005A-02) PIZZELLA ELECTRON AND PROTEN MEASUREMENTS (20 EV-50 KEV)	R 1-100F 03 TO 1-200S 04 EV	e eu	
	EXPLORER 43 (71-019A-05) FRANK LOW-ENERGY PROTONS AND ELECTRONS	•	H	61
	EXPLORER 47. (72-073A-08) KRIMIGIS PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS		GH	112
	IMP-J (IMP+J -08) KRIMIGIS	,	·	
	PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	R 1.500E 03 TO 2.500E 06 EV	GH	244
	APOLLO 14 LM/ALSEP (71-008C-08) O'BRIEN CHARGED PARTICLE LUNAF ENVIRONMENT	R 2.000E 03 TO 2.000E 04 EV	GH M	58
	MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 2.000E 03 TO 2.000E 03 EV	<b>GH</b>	287
	ATS-F (ATS-F -03) ARNOLDY LOW-ENERGY PROTON/ELECTRON EXPERIMENT	R 2.000E 03 TO 2.500E 04 EV	F	191
929	ESGEO (ESGEO -04) HULTQUIST LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	R 2-000F 03 TO 2-000F 04 EV	F	207
	HEL IDCENTRIC (HELUCTR-09) ANDERSON		. <b>*</b>	207
	X-RAYS AND ELECTRONS	R 2.000E 03 TO 2.000E 04 EV	н	237
	DAUGHTER (DAUGHTR-08) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 2-000E 03 TO 2-000E 03 EV	GH	200
	ISIS 2 (71-024A-04) MCDIAFMID ENERGET IC PART ICLE DETECTORS	R 3.000E 03 TO 2.000E 05 EV	DEF	69
	ATS-F -Q5) MC ILWAIN AURORAL PARTICLES EXPERIMENT	R 5.000E 03 TO 5.000E 04 EV	F	192
	MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 6.000E 03 TO 6.000E 03 EV	.: GH	287
	DAUGHTER (DAUGHTR-08) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 6.000E 03 TO 6.000E 03 EV	GH	200
	ATS 5 (69-069A-11) MCILWAIN BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	R 6.000E 03 TO 6.000E 04 EV	F	39
	ISIS 1 (65~009A-04) MCDIARMID ENERGETIC PARTICLE DETECTORS	R 8.000E 03 TO 7.000E 05 EV	DEF	27

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)	
MOTHER (MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 8.000E 03 TO 8.000E 04 EV GH 287
DAUGHTER (DAUGHTR-08) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 8.000E 03 TG 8.000E 04 EV GH 200
MARINER 77A (MARN77A-C7) KRINIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELES COPE	R 1.000E 04 TO 1.000E 05 EV H 5 273
MARINER 77E (MARN 77B-07) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	R 1.000E 04 TO 1.000E 05 EV H 5 279
EXPLORER 43 (71-019A-07) BOSTROM MONITORING OF SOLAR PROTONS	U 1.000E 04 TO INFINITY FGH 62
DAUGHTER (DAUGHTR-03) FRANK HOT PLASMA	R 1.000E 04 TO 5.000E 04 EV GH 198
HAWKEYE (HAWKEYE-02) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R 1.000E 04 TG 5.000E 04 EV DEFGH 222
MOTHER (MOTHER -03) FRANK HOT PLASMA	R 1.000E 04 TO 5.000E 04 EV GH 283
EXPLORER 47 (72-073A-04) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	R 1.000E 04 TO 5.000E 04 EV GH 110
IMF-J (IMP-J -04) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	R 1.000E 04 TO 5.000E 04 EV GH 242
HEGS 2 (72-005A-02) PIZZELLA ELECTRON AND PROTEN MEASUREMENTS (20 EV-50 KEV)	R 1-200E 04 TO 5-000E 04 EV C GH 87
EXPLORER 43 (71-019A+05) FRANK LOW-ENERGY PROTENS AND ELECTRONS	R 1.200E 04 TO 5.000E 04 EV H 61
EXPLORER 43 (71-019A-06) ANDERSON MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	R 1.800E 04 TO 1.800E 05 EV H 61
EXPLORER 43 (71-019A-06) ANDERSON MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	R 2.000E 04 TO INFINITY H 61
ATS-F -04) WINCKLER PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION	R 2.000E 04 TO 1.500E 06 EV F 191

	DESCRIPTIVE EXPERIMENT TITLE	s	KAX	VA	LUE	Ċ	LAMBDA	•		ABCDEFGH1/01	2345M	PAGE
	2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)		•									
	DAUGHTER (DAUGHTR-07) WILLIAMS											
	ENERGET IC ELECTRONS AND PROTONS	R	2.00	0 E	04 T	0	2 •000E	0 5	EV	DEFGH		199
	HELIOCENTRIC (HELOCTR-CS) ANDERSON											
	X-RAYS AND ELECTRONS	R	2.00	0E	04 T	O :	2.000E	05	€¥	н		237
	MOTHER (MOTHER -CS) WILLIAMS											
	ENERGETIC ELECTRONS AND PROTONS	R	2.00	0E	04 T	го	2.000E	05	ΕV	DEF GH		286
	PIONEER 10 (72-012A-05) FILLIUS											
-	JOYJAN TRAPPED RADIATION	U	2.50	0E	04 1	O	2.500E	05	E٧	н	5	92
	PIONEER 11 (73-019A-05) FILLIUS											
	JOVIAN TRAPPED RACIATION	U·	2.50	0E	04 T	0	2.500E	05	ΕV	н	5	133
	VELA 5B (69-046E-04) SINGER											
	ELECTRON DETECTORS	R	3.00	0E	0,4 T	re .	1.500E	05	E۷	GН		35
	VELA 6A (70-027A-04) SINGER									*		
	ELECTRON DETECTORS	F	3-00	30	04 T	10	1.500E	05	E۷	GH		49
	VELA 68 (70-0278-04) SINGER											
	ELECTRON DETECTORS	R	3.00	0E	04 T	ra	1.500E	05	Eν	GH		52
UI .	EXPLORER 47 (72-073A-05) WILLIAMS			•								
Ξ	ENERGETIC ELECTRONS AND PROTONS	R	3.00	0E -	04 7	ro i	4-000E	05	EV	GH		111
	ESGED (ESGED -01) PFOTZER						-					
	ELECTRON AND PROTON PITCH ANGLE		_									
	DISTRIBUTION	R	3.00	0E	04 T	0 :	2-000E	05	EV	F		206
	IMP-J (IMP-J -CE) WILLIAMS											
	ENERGET IC ELECTRONS AND PROTONS	Ħ	3.00	0E (	04 T	0 4	4.000E	05	EV	GH		243
	EXPLORER 45 (71-096A-G3) WILLIAMS											
	SOLID-STATE DETECTORS	R	3 • 50	OE (	04 T	0	4.000E	05	ΕV	DEF		85
	0V5-6 . (69-0468-05) YATES											
	LOW-ENERGY ELECTRON DETECTOR	0	4.00	0E (	04 T	0	INFINIT	Y		EFGH		31
	ATS 5 (69-069A-04) MQZER											
	TRI-DIRECTIONAL MEDIUM-ENERGY PARTICLE DETECTOR		4.00	n= .	04 T	· n	1.200E	0.5	e iz	F		38
		, r	7100	02	U-+ 1	ч.	# # 200E	ΨĐ	E.V	-		Ja
	HELIOS-A (HELIO-A-10) KEPPLER	_	4 00	05					~			
	ENERGETIC ELECTRON DETECTOR	R	4+00	OE.	04 1	u :	1.000E	05	£.V	<b></b>		227
	HELIOS-E (HELIO-B-10) KEPPLER	_										
	ENERGETIC ELECTRON DETECTOR	R	4+00	0E	04 T	C :	1.000E	05	EV	н		232
	ESRO 4 (72-092A-03) HULTGUIST		•							•		
	AURORAL PARTICLE SPECTROMETER	U	4.00	0E	04 T	· C :	1-000E	08	ĒΛ	c		121

EXPERIMENT ID EXPERIMENTER . E MIN VALUE (F DR E) MAX REGION

MEASUREMENTS

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	
2.1.2 OF ENERGIES CREATER THAN THERMAL (GREATER THAN 1 KEV)	
EXPLORER 43 (71-019A-08) FRANK LOW-ENERGY PROTONS AND ELECTRONS	U 4.500E 04 TO INFINITY H 61
HELIOS-A (HELIO-A-CE) TRAINGE GALACTIC AND SOLAF COSMIC RAYS	R 5.000E 04 TO 5.000E 05 EV H 226
HELIOS-B (HELIO-B-CE) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 5.000E 04 TO 5.000E 05 EV H 231
EXPLORER 43 (71-019A-06) MCDCNALD SOLAR AND GALACTIC COSMIC-RAY STUDIES	R 5.000E 04 TC 2.000E 06 EV FGH 63
EXPLORER 47 (72-073A-13) CLINE STUDY OF COSMIC-FAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS	R 5.000E 04 TO 5.000E 05 EV GH 115
PIONEER 10 (72-012A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	U 5.000E 04 TO INFINITY H 95
ESRO 4 (72-092A-03) HULTQLIST AURORAL PARTICLE SFECTROMETER	0 5.000E 04 TO 1.500E 05 EV C 121
FIGNEER 11 (73-019A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	U 5.000E 04 TO INFINITY H 136
ATS-F (ATS-F -06) MASLEY SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	R 5.000E 04 TG 8.000E 05 EV F 192
PIONEER 10 (72-012A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	R 5.000E 04 TC INFINITY 5 95
PIONEER 10 (72-012A-12) MCCONALD COSMIC-RAY SPECTRA	R 5.000E 04 TO 1.000E 06 EV H \$6
PIONEER 11 (73-019A-12) MCDGNALD COSMIC+RAY SPECTRA	R 5.000E 04 TO 1.000E 06 EV H 136
PIONEER 11 (73-019A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	U 5.000E 04 TG INFINITY 5 136
PIONEER 10 (72-012A-12) MCDONALD COSMIC-RAY SPECTRA	R 5.000E 04 TO 1.000E 06 EV 5 96
PIONEER 11 (73-019A-12) WCDDNALD COSMIC-RAY SPECTRA	R 5.000E 04 TC 1.000E 06 EV 5 136
HELIOCENTRIC (HELOCTR-04) VON FOSENVING SOLAR, GALACTIC, AND MAGNETOS PHERIC ENERGETIC PARTICLES	0 7.000E 04 TO 2.000E 05 EV H 235
ATS-F (ATS-F -07) BLAKE OMNIDIRECTIONAL SPECTROMETER	U 8.000E 04 TO 6.000E 05 EV F 192

MEDIUM-ENERGY SOLAR PROTONS AND

•		
SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERÎMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M P	PAGE
2.1.2 OF ENERGIES GREATER THẬN THERMAL (GREATER THAN 1 KEV)		
MOTHER (-MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 8.000E 04 TO 2.000E 05 EV GH	287
DAUGHTER (DAUGHTR-08) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 8.000E 04 TO 2.000E 05 EV GH	200
HELIOS-A (HELIO-A-10) KEPPLER ENERGETIC ELECTRON DETECTOR	R 1.000E 05 TC 1.000E 06 EV H	227
HELIOS-B (HELIO-8-10) KEPPLER ENERGETIC ELECTRON DETECTOR	R 1.000E 05 TO 1.000E 06 EV H	232
ARRINER 77A (MARN77A-O7) KRIMIGIS LOW-ENERGY CHARGEE PARTICLE ANALYZER AND TELESCOPE	8 1.000E 05 TO 1.100E 06 EV H 5	273
MARINER 778 (MARN 778-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND		-,-
- TELESCOPE	R 1.000E 05 TO 1.100E 06 EV H 5	279
PICNEER 10 (72-012A-05) FILLIUS JOVIAN TRAPPED RACIATION	R 1.000E 05 TO 3.000E 06 EV H 5	92
PIONEER 11 (73-019A-05) FILLIUS JOVIAN TRAPPEC RACIATION	R 1.000E 05 TO 3.000E 06 EV H 5	133
ITOS-F (ITOS-F +01) BESTREM SQLAR PROTON MONITOR	U 1.400E 05 TO INFINITY BC	251
ITOS-G (ITOS-G -01) BCSTROM SQLAR PROTON MONITOR	U 1.400E 05 TO INFINITY BC	254
EXPLORER 47 (72-073A-06) STONE ELECTRONS AND HYDROGEN AND HELIUM	D 1 5005 05 TO 1 5005 04 SH CH	111
EXPLORER 47 (72-073A-05) MCDGNALD	R 1.500E 05 TO 1.500E 06 EV GH	111
SOLAR- AND COSMIC-RAY PARTICLES	R 1.500E 05 TG 2.000E 06 EV GH	113
IMP-J -C6) STGNE ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	R 1.500E 05 TO 1.500E 06 EV GH	243
IMP-J - 05) MCDONALD SOLAR- AND COSMIC-FAY PARTICLES	R 1.500E 05 TO 2.000E 06 EV GH	244
EXPLORER 43 (71-015A-C6) ANDERSON MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	R 1.800E 05 TG 4.500E 05 EV H	61
EXPLORER 43 (71-019A-06) ANDERSON		••

	R FANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.1.2 OF ENERGIES (REATER THAN THERMAL (GREATER THAN 1 KEV)	U 1.800E 05 TO INFINITY H 61
PIONEER 10 (72-012A-02) SIMPSCN CHARGED PARTICLE COMPOSITION	R 2.000E 05 TO 2.000E 06 EV H 5 91
FIGNEER 11 (73-019A-02) SIMPSON CHARGED PARTICLE CCMPOSITION	R 2.000E 05 TO 2.000E 06 EV H 5 132
MARINER-J VENUS/MERCURY (MARINJ -07) SIMPSON ENERGETIC PARTICLES	R 2.000E 05 TO 2.000E 06 EV H 12 269
DAUGHTER (DAUGHTR-07) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 2.000E 05 TO 2.000E 06 EV DEFGH 199
HELIOCENTRIC (HELOCTR-09) ANDERSON X-RAYS AND ELECTRONS	R 2.000E 05 TO 1.000E 06 EV H 237
MOTHER (MOTHER -09) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 2.000E 05 TC 1.000E 06 EV DEFGH 286
EXPLORER 47 (72-073A-07) SIMFSON SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	R 3.000E 05 TO 3.000E 06 EV GH 112
IMP-J -07) SIMPSON SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	R 3.000E 05 TC 3.000E 06 EV GH 244
HELIOCENTRIC (HELOCTR-04) VON ROSENVING SOLAR. GALACTIC, AND WASNETOSPHERIC ENERGETIC PARTICLES	G 3.000E 05 TO 1.200E 07 EV H 235
PIONEER 9 (68-10CA-CE) BEBBER COSMIC-RAY TELESCOPE	R 3-100E 05 TO 1-900E 06 EV H 21
PIONEER 8 (67-123A-(6) WEBBER COSMIC-RAY GRADIENT DETECTOR	U 3.400E 05 TO 5.200E 05 EV H 15
HEDS 2 (72-00%A-04) PAGE PARTICLE COUNTER TELESCOPE	R 4.500E 05 TO 3.200E 06 EV C GH 88
ATS 5 (65-065A-02) MCILWAIN OMNIDIRECTIONAL FIGH-ENERGY PARTICLE DETECTOR	R 5.000E 05 TO 5.000E 06 EV F 38
GOES-E (GOES-E -C2) WILLIAMS ENERGETIC PARTICLE MONITOR	U 5.000E 0S TO INFINITY F 216
GDES-C (GCES-C -C2) WILLIAMS ENERGETIC PARTICLE MUNITUR	U 5.000E 05 TO INFINITY F 219
SMS-A (SMS-A -C2) WILLIAMS ENERGETIC PARTICLE MONITOR	U 5.000E 05 TO INFINITY F 322

SATELLITE NAME EXPERIMENT ID EXPERIMENTER  DESCRIPTIVE EXPERIMENT TITLE  2.1.2 UF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)	
HELIOS-A (HELIO-A-08) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 5.000E 05 TO 5.000E 06 EV H 226
HELIOS-B (HELIO-B-08) TRAINCE GALACTIC AND SOLAE COSMIC RAYS	R 5.000E 05 TC 5.000E 06 EV H 231
EXPLORER 47 (72-073A-13) CLINE STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS	R 5.000E 05 TO 2.000E 06 EV GH 115
SMS-B (SMS-B -01) WILLIAMS ENERGETIC PARTICLE MONITOR	•
SMS-C (SMS-C -02) WILLIAMS ENERGET IC PARTICLE MONITOR	U 5.000E 05 TO INFINITY F 328
FIONEER 8 (67-123A-06) WEBBER COSMIC-RAY GRADIENT DETECTOR	U 5.200E 05 TO 4.300E 06 EV H 15
ATS-F -07) BLAKE  OMNIDIRECTIONAL SPECTROMETER	R 6.000E 05 TO 4.000E 06 EV F 192
EXPLORER 47 (72-073A-06) STONE ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	£ 1.500E 06 TO 2.800E 06 EV GH 111
IMP-J -06) STONE ELECTRONS AND HYCROGEN AND HELIUM ISOTOPES	R 1.500E 06 TO 2.800E 06 EV GH 243
FIONEER 9 (68-10CA-CE) WEBBER COSMIC-RAY TELESCOFE	
FIONEER 10 (72-012A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	U 2.000E 06 TO INFINITY H 95
FIONEER 11 (75-015A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	U 2.000E 06 TO INFINITY . H 136
EXFLORER 47 (72-073A-05) NCDCNALD SCLAR- AND COSMIC-RAY PARTICLES	U 2.000E 06 TO 1.200E 07 EV GH 113
IMP-J -(S) MCDENALD SOLAR- AND COSMIC-FAY PARTICLES	U 2.000E 06 TD 1.200E 07 EV GH 244
FIONEER 10 (72-012A-02) SIMPSON CHARGED PARTICLE COMPOSITION	R 2.000E 05 TO 2.000E 07 EV H 91
FIGNEER 11 (72-019A-02) SIMESCN CHARGED PARTICLE COMPOSITION	R 2.000E 06 TO 2.000E 07 EV H 5 132
EXPLORER 43 (71-019A-05) SINFSCN	

	H RANGE UP MEASUREMENTS	
SATELLITE NAME EXPERIMENT 1D EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	E MIN VALUE (F OR E) MAX REGI S MAX VALUE (LAMBDA) MIN ABCO	
2.1.2 OF ENERGIES CREATER THAN THERMAL (GREATER THAN 1 KEV)		
NUCLEAR COMPOSITION OF COSMIC AND SOLAR		
PARTICLE RADIATIONS	R 2.000E 06 TO INFINITY	н 63
PIONEER 11 (73-019A-11) VAN ALLEN		
JOVIAN CHARGED PARTICLES EXPERIMENT	U 2.000E 06 TO INFINITY	5 136
PIGNEER 10 (72-012A-11) VAN ALLEN		
JOVIAN CHARGED PARTICLES EXPERIMENT	U 2.000E 06 TO INFINITY	5 95
EXPLORER 43 (71-019A-08) MCDCNALD		
SOLAR AND GALACTIC COSMIC-RAY STUDIES	R 2.700E 06 TO 2.100E 07 EV	FGH 63
PIONEER 11 (73-015A-CE) FILLIUS		
JOVIAN TRAPPEC RACIATION	U 3.000E 06 TO 1.000E 36 EV	н 5 133
EXPLORER 47 (72-C73A-C7) SIMPSON		
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z		GH 112
ISOTOPE EXPERIMENT	K 3.000E 09 10 1.000E 01 EA	GR 112
IMP-J (IMP-J -07) SIMPSON		
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z		C1. 244
EXPERIMENTS	R 3.000E 05 TO 1.000E 07 EV	GH 244
MARINER 77A (MARN77A-08) VOGT		
HIGH- AND MODERATELY LOW-ENERGY		
COSMIC-RAY TELESCOPE	R 3.000E 06 TO 1.000E 07 EV	н 5 274
MARINER 778 (MARN778-08) VOGT		
HIGH- AND MODERATELY LOW-ENERGY		
COSMIC-RAY TELESCOPE	R 3.000E 06 TO 1.000E 07 EV	н 5 280
PIONEER 10 (72-012A-05) FILLIUS		
JOVIAN TRAPPED RACIATION	U 3.000E 06 TO INFINITY	н 5 92
ATS-F (ATS-F -07) BLAKE		
OMNID IRECTIONAL SPECTROMETER	U 4.000E 06 TO INFINITY	F 192
PIONEER 8 (67-123A-06) MEBBER		
COSMIC-RAY GRADIENT DETECTOR	U 4-200E 06 TC 8-400E 06 EV	н 15
HEL IOCENT RIC (HELOCTR-06) MEYER		
COSMIC-RAY ELECTRONS AND NUCLEI	R 5.000E 06 TO 5.000E 07 EV	н 236
PIONEER 9 (68-100A-06) WEBBER		
COSMIC-RAY TELESCOPE	U 5.100E 06 TO INFINITY	н 21
PIONEER 10 (72-012A-05) FILLIUS		
JOVIAN TRAPPED RACIATION	U 7.000E 06 TO INFINITY	н 5 92
PIONEER 11 (73-019A-05) FILLIUS		
JOVI AN TRAPPED RACIATION	U 7.000E 06 TO 1.000E 36 EV	н 5 133
FIGNEER 10 (72-012A-02) SIMPSON		
Language and the same and same age.		

R RANGE OF MEASUREMENTS

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ATELLITE NAME DESCRIPTIVE			E MIN	VALUE VALUE	(F (	,	MAX			PLANET 12345M	
1+2 OF ENERGIES GREAT	ER THAN THERMAL	(GREATER THAN 1 KEV)				/					
HARGED PARTICLE COMPO	S IT ION		U 9.00	0E 06	TQ.INF	INITY			н	5	91
NEER 11 HARGED PARTICLE COMPO	(73-019A-02) S SITION		U 9.00	0E 06	TO INF	INITY			н	5	132
S 2 IIGH-ENERGY ELECTRONS.		•	R 1.00	OE 07 1	TO 1-0	00E 08	EV	c	GH		88
NEER 10 DVIAN CHARGED PARTICL	(72-012A-11) v. ES EXPERIMENT	AN ALLEN	U 1.00	00E 07	TQ INF	YTINI			н		95
EER 11 Vian Charged Particl		AN ALLEN	U 1.00	0E 07	TO INF	YTINI			н		136
EER 10 VIAN TRAPPED RADIATI	(72-012A-0E) F	ILLfos	U 1.00	00E 07	TO INF	INITY			н	5	92
EER 10 VIAN CHARGED PARTICL	(72-012A-11) V ES EXPERIMENT	AN ALLEN	U 1.00	10E 07	TO INF	INITY		•		5	95
EER 11 Vian trapped raciati	(73-019A-05) F	ILL IUS	U 1.00	0E 07	TO 1.0	00E 36	ΕV		н	5	133
ÆER 11 Wian Charged Particl	(73-019A-11) V ES EXPERIMENT	AN ALLEN	U 1.00	0E 07	TO INF	INITY				5	136
EER 10 ARGED PARTICLE COMPO	(72-012A-02) S SITION	IMPSON	R 2.00	0E 07	TG 3.0	00E 07	ΕV		н		91
EER 11 Arged particle compo	(73-019A-02) S SITION	IMPSON	R 2.00	0E 07	TC 3-0	00E 07	EV		н	5	132
DCENTRIC SMIC-RAY ELECTRONS A	(HELDCTR-06) M	EYER	R 5.00	0E 07	TO 4.0	00E 08	ΕV		н		236
DRER 43 CLEAR COMPOSITION OF			R 5.00	ዕድ ዕን 1	TO INE	INITY			н		63
2	(72-00EA-CE) D		., .,						**		
		********	R 1.00	0E 08.1	T Q 6.0	00E 08	E۷	c	GH		88

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SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERTMENT TITLE	R RANGE OF MEASUREME E MIN VALUE (F OR E) S MAX VALUE (LAMBDA)	MAX REGION	PLANET 012345M PAGE
2.2 SENSING PROTONS OR HYDROGEN LONS			
ISIS 1 (69-009A-08) SAGALYN SPHERICAL ELECTROSTATIC ANALYZER	U THERMAL ENERGIES	вс	28
PIONEER VENUS PROBE A (PIO78PA-04) KNUDSEN RETARDING POTENTIAL ANALYZER	U THERMAL ENERGIES		2 301
ESGEO (ESGEO -02) BOYD THERMAL PLASMA FLOW	R	F	206
EXDS-A (EXOS-A -02) UNKNOWN ENERGETIC PARTICLE DETECTORS	0	8	209
EXOS-8 (EXOS-8 -(1) UNKNOWN MAGNETOSPHERIC PLASMA PROBE	R THERMAL ENERGIES	DE	211
APOLLO 14 LM/ALSEP (71-008C-06) FREEMAN SUPRATHERMAL ION DETECTOR	R 2.000E-01 TO 4.850E 02	EV GH	57
APOLLO 15 LM/ALSEP (71-063C-05) FREEMAN SUPRATHERMAL ION CETECTOR	R 2.000E-01 TC 4.860E 01	EV GH	м 78
EXOS-8 (EXOS-8 +02) UNKNOWN ENERGETIC PARTICLE DETECTORS	O 1.000E 00 TO 1.000E 03	EV DE	211
DAUGHTER (DAUGHTR-03) FRANK HOT PLASMA	R 1.000E 00 TO 1.000E 03	Е <b>v</b> GH	198
HAWKEYE (HAWKEYE-02) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R 1.000E 00 TO 1.000E 03	EV DEFGH	222
MOTHER (MOTHER -03) FRANK HOT PLASMA	R 1.000E 00 TO 1.000E 03	<b>€v</b> ĢH	283
EXPLORER 43 (71-019A-05) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R 1.700E 00 TO 5.500E 02	E <b>V</b> H	61
EXPLORER 47 (72-073A-04) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	R 5.000E 00 TO 1.000E 03	EV GH	110
IMP-J - 04) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	R 5.000E 00 TO 1.000E 03	E∀ GH	242
MARINER 778 (MARN778-06) BRIDGE PLASMA	R 5.000E 00 TO 1.000E 03	EV H	5 279
MARINER 77A (MARN77A-06) BRIDGE PLASMA	R 5.000E 00 TD 1.000E 03	EV H	5 273
ISIS 2 (71-024A-05) HEIKKILA SUFT-PARTICLE SPECTRUMETER	R 1.000E 01 TO 1.000E 04	EV <b>DE</b> F	70

		EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	E' MI		UE		M.		LANET	9 <i>4ce</i>	
	SENSING PROTONS OR		a MA.	N AWE	JE.	: LAMOUA	, M	N MBCDEFGHI/01	<345M	raut	
								•			
		(71-063C-05) FREEMAN ECTOR	R 1+	000E 01	l to	3.500E	03 EV	g G H	ч	78	
APC	OLLO 14 LM/ALSEP	(71-008C-06) FREENAN									
		ECT OR	R 1.	000E 01	Lto	3.500E	03 E	у сн		57	
	OLLO 12 LM/ALSEP										
S	SOLAR WIND SPECTROMET	ER ************************************	R 1+	800E 01	L ŤC	9.780E	03 E/	GH '	M	41	
	LA 58	(69-046E-05) BAME									
S	SOLAR WIND EXPERIMENT	******************************	R 2.1	000E 01	l To	3.300E	04 E	GН		36	
VE.	LA 6A	(70-027A-CS) BAME									
9	SOLAR WIND EXPERIMENT	******************************	R 2.	DODE 01	1 70	3.300E	04 E	' · G		49	
		(71-019A-05) FRANK									
		ELECTRONS	R 2.	400E 01	TC	1.100E	/3 E0	н		61	
	JS 2 ELECTRON AND PROTON M	(72-065A-62) PIZZEŁLA				•					
	•	esurements (20	R. 2 • 6	100E 01	l to	1.100E	03 EV	C GH		87	
EXE	PLORER 43	(71-019A-11) BAME									
		PL ASMA	R 4.5	500E 01	1 70	3.400E	04 EV	DEF GH		64	
	5-F	(ATS-F -05) MCIL MAIN									
A	NURORAL PARTICLES EXP	ER IMENT	R 5.	000E 0	1 70	5.000E	02 E	F		192	
		(DAUGHTR-01) PASCHMANN									
	50-EV TO 40-KEV PROTO PO-KEV ELECTRON DLASM		9 5 7	ነበሰር ሳ	. +-		na :				
_	TO THE ELECTRON PLASM	A PRO 8E	R D∗l	JUUE (1)		4.000E	U4 EV	GH		197	
_	THER	(MOTHER -01) BANE									
	SO-EV TO 40-KEV PROTO										
2	CO-KEY ELECTRUN PLASM	A PROBE	H 5.€	100E 01	го	4.000E	US EV	GH		282	
	JGH TE R	(DAUGHTR-02) EGIDI									
	SO-EV TO 25-KEV ION A						<b>.</b>	_			
,€	LCCIFUN PLASMA PROBE	\$	R 5.4	000E 01	L TO	2.500E	04 E	GH		197	
IMP	) <b>-</b> j	(IMP-J -02) BRIDGE									
М	MEASUREMENT OF SOLAR	PL ASMA	R 5.0	000E 01	i To	7.000E	03 EV	GH		241	
		(72-073A-02) BRIDGE									
, м	IEASUREMENT OF SOLAR	PL ASMA *****************************	R 5.0	000E 01	1 10	7.000E	03 EV	GH		109	
. ATS	5 5 31-directional Low En	(69-069A-11) MCILWAIN								•	
		ERGY MARTICLE	R 6.0	000E 01	T O	6.000E	02 EV	F		39	
PIO	INEER 6	(65-105A-02) BRIDGE									
5	OLAR WIND PLASMA FAR	ADAY CUP	R 7.5	500E 01	то	9.485E	03 EV	. н		4	
									•		

•	R RANGE CF MEASJREMENTS
SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	E MIN VALUE (F UR E) MAX REGIJN PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.2 SENSING PROTONS OR HYDROGEN TONS	
EXPLORER 43 (71-019A-11) BAME MEASUREMENT OF SOLAR PLASMA	R 1.000E 02 TO 8.000E 03 EV DEFGH 64
PI ONEER 10 (7 2-012A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV H 96
FIGNEER 11 (73-019A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV H 137
PIONEER 10 (72-012A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV 5 96
FIONEER 11 (73-019A-13) WOLFE PLASMA EXPERIMENT	R 1.000E 02 TO 1.800E 04 EV 5 137
VELA 6A (70-027A-05) BAME SOLAR WIND EXPÉRIMENT	R 1.200E 02 TD 5.000E 03 EV GH 49
PIONEER 8 (67-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TO 1.500E 04 EV H 12
PIONEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TO 1.500E 04 EV H 18
HELIOCENTRIC (HELOCTR-01) BAME 150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE	R 1.500E 02 TC 7.000E 03 EV GH 234
PIONEER 8 (67-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TC 1.500E 04 EV H 12
PIONEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TC 1.500E 04 EV H 18
ESRO 4 (72-092A-03) HULTQUIST AURORAL PARTICLE SPECTROMETER	0 1.500E 02 TO 1.000E 03 EV C 121
PIONEER 8 (57-123A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TO 1.500E 04 EV H 12
PIONEER 9 (68-100A-02) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TO 1.500E 04 EV H 18
PIONEER 8 (67-123A-G2) WOLFE ELECTROSTATIC ANALYZER	R 1.500E 02 TG 1.500E 04 EV H 12
APOLLG 14 LM/ALSEP (71-008C-08) D'BRIEN CHARGED PARTICLE LUNAR ENVIRONMENT	R 1.700E 02 TO 2.000E 03 EV GH M \$8
IMP-J -1C) BAME MEASUREMENT OF SOLAR PLASMA	R 2.000E 02 TO 2.000E 04 EV GH 245
PIONEER 7 (66-075A-03) WOLFE	

		•								
			R	RANCE	0F	MEASU	JREM	ENTS		
	SATELLITE NAME	EXPERIMENT ID EXPERIMENTER				(F OR E			REGION PLAN	
	DESCRIPTIVE	EXPERIMENT TITLE	S	MAX V	ALUE	(LAMBD)	()	MIN	ABCDEFGHI/01234	5M PAGE
	2.2 SENSING PROTONS OR	HYDROGEN IONS								
	ELECTROSTATIC ANALYZER	••••	R	2.0008	6 02 T	1.000E	. 04	ΕV	н	8
	EXPLORER 47	(72-073A-10) BAME								
	MEASUREMENT OF SOLAR F	LASMA	٥	2 - 0.006	- 02 T	2.000E		έv	CH	
				2.000	. 02 10	2 24000	. 04	- ₩	GH <sub>.</sub>	113
	ESGEO	(ESGEO -C4) HULTGUIST								
	LOW-ENERGY ELECTRON AN									
	ANGLE DISTRIBUTION	**********************	R	2.0006	02 T	0 2.000E	03	E٧	F	207
	HEL IOS-B	(HELIO-B-09) ROSENBAUER								
		**************************************	p	2.1008	02 T	1.500E		EV	11	070
_				*****	. 42	. 143005	. 04	C.A.	H	232
	HELIOS-A	(HELIG-A-09) ROSENBAUER								
	PLASMA DETECTORS	••••••	R	2.1308	02 1	1.5008	04	E۷	н	226
	ATS-F	/470 F								
		(ATS-F -05) MCILWAIN	-	E 050E	T	3 5 0005				
	THE THE PARTY OF T		ĸ	5.000	02 11	5.000E	. 03	EV	F	192
	ATS 5	(69-069A-11) MCILWAIN								
	81-DIRECTIONAL LOW ENS									•
	DET ECTOR	• • • • • • • • • • • • • • • • • • • •	R	6.000E	02 TC	5.000E	03	EV	F	39
	EXPLORER 45	171 00 (A 01) ((DEC.))								
	CHANNEL ELECTRON MULTI	(71-09 (A-01) HOFFMAN		•						
C)		- C1CRJ - WEITH Seeeseeeeeeeeeeeeeeeeeeeeeeeeeeeee		8-0005	. 02 TO	2.500E	0.4	EV	: DEF	84
-			•••				. •	_*	9LF	64
	MARINER-J VENUS/MERCURY									
	MEASUREMENT OF PLASMA	ENVIRONMENT	R	8.0006	02 T	8.000E	03	ΕV	H	267
	EXOS-B	(EXOS-B -02) UNKNOWN								
		ECTORS ************************************		1.0006	07 70	1.000E	^ 4		DE	244
			Ü	1.000	. 43	140000	04	₽¥	UE .	211
	EXPLORER 47	(72-073A-04) FRANK								
	MEASUREMENT OF LOW-ENE									
	ELECTRONS	***********************	R	1.000€	03 T	1.000E	04	EV	GH	110
	IMP-J	(IMP-J -C4) FRANK				,				
	MEASUREMENT OF LOW-ENE									
		*******************	R	1.000E	03 TO	1.000E	04	ΕV	GH	242
	HAWKEYE	(HAWKEYE-02) FRANK								
	LOW-ENERGY PROTONS AND	ELECTRONS	R	1.000E	03 TO	1.000E	04	ΕV	DEFGH	222
	MOTHER	(MOTHER -03) FRANK								
		*************************************	۵	1.0006	03 70	1.000E	ο Δ	EV	GH .	283
						140000	<b>-</b>		GH .	203
	ESRG 4	(72-092A-03) HUL TQ EIST								
	AURORAL PARTICLE SPECT	ROMETER	O	1.000E	03 Tü	1.500E	04	ΕV	С	121
	DALICHTER	ADAUGHTD-011 FRANK								•
	DAUGHTER HOT PLASMA	(DAUGHTR-03) FRANK	, <sub>0</sub>	1.000=	A3 T0	1.000E	n a	± v	GH	100
			-		40 111	INVOE	V4	E V	uп	198
	HEOS 2	(72-0CEA-C2) PIZZELLA							•	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCOEFGHI/012345M PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS	
ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	R 1.100E 03 TO 1.200E 04 EV C GH 87
EXPLORER 43 (71-019A-05) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R 1.100E 03 TO 1.200E 04 EV H 61
DAUGHTER (DAUGHTR-08) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 2.000E 03 TO 2.000E 03 EV GH 200
ESGEO (ESGEO -04) HULTQUIST LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	R 2.000E 03 To 2.000E 04 EV F 207
APOLLC 14 LM ALSEP (71-008C-08) O'BRIEN CHARGED PARTICLE LUNAR ENVIRONMENT	R 2.000E 03 TO 2.000E 04 EV GH M 58
MOTHER (MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 2.000E 03 TO 2.000E 03 EV GH 267
ATS-F (ATS-F -05) MCILWAIN AURORAL PARTICLES EXPERIMENT	R 5.000E 03 TO 5.000E 04 EV F 192
DAUGHTER (DAUGHTR-08) ANDERSON.  ENERGETIC ELECTRONS AND PROTONS	R 6.000E 03 TO 6.000E 03 EV GH 200
ATS 5 (69-069A-11) MCILWAIN BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	R 6.000E 03 TO 6.000E 04 EV F 39
MOTHER (MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTUNS	R 6.000E 03 TO 6.000E 03 EV GH 287
EXPLORER 47 (72-075A-04) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	R 1.000E 04 TO 5.000E 04 EV GH 110
DAUGHTER (DAUGHTR-03) FRANK HOT PLASMA	R 1.000E 04 TO 5.000E 05 EV GH 198
IMP-J (IMP-J -G4) FRANK MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS:::::	R 1.000E 04 TG 5.000E 04 EV GH 242
MOTHER (MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 1.000E 04 TO 1.000E 05 EV GH 287
HAWKEYE (HAWKEYE-02) FRANK LOW-ENERGY PROTONS AND ELECTRONS	R 1.000E 04 TO 5.000E 04 EV DEFGH 222
MOTHER — C3) FRANK HOT PLASMA	R 1.000E 04 TO 5.000E 04 EV GH 283
CAUGHTER (DAUGHTR-CE) ANDERSON	,

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/0123454 PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS	
ENERGETIC ELECTRONS AND PROTONS	R 1.000E 04 TO 1.000E 05 EV GH 200
HECS 2 (72-005A-02) PIZZELLA ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	
HEOS 2 (72-005A-02) PIZZELLA	R 1.200E 04 TD 5.000E 04 EV C GH 87
ELECTRUN AND PROTEN MEASUREMENTS (20 EV-50 KEV)	R 1-200E 04 TO 5-000E 04 EV C GH 87
EXPLORER 43 (71-019A-05) FRANK LOW-ENERGY PROTONS AND ELECTRONS	
ISIS 2 (71-024A-04) MCDIARNID	R 1-200E 04 TO 5-000E 04 EV H 61
ENERGETIC PARTICLE DETECTORS	R 2.000E 04 TO 5.000E 07 EV DEF 69
ATS-F (ATS-F -01) KONRADI MEASUREMENT OF LOW-ENERGY PROTONS	R 2.000E 04.TU 3.000E 05 EV F 191
ATS-F -03) ARNOLDY LOW-ENERGY PROTON/ELECTRON EXPERIMENT.	R 2.000E 04 TO 5.000E 05 EV F 191
MOTHER (MOTHER -05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 2.000E 04 TO 2.000E 05 EV DEFGH 286
ATS-F -04) WINCKLER PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION	5 3 0005 04 <b>7</b> 0 5 0007 05 50
DAUGHTER (CAUGHTR-07) WILL IAMS	R 2.000E 04 TO 5.000E 05 EV F 191
ENERGETIC ELECTRONS AND PROTONS	R 2.500E 04 TG 2.000E 05 EV DEFGH 199
EXPLORER 45 (71-09 (A-02) FRITZ ZINC SULFIDE THIN-FILM SCINTILLATOR	R 2.500E 04 TO 8.720E 05 EV DEF 85
HELIOCENTRIC (HELOCTR-08) ELLIOTT ENERGETIC PROTONS	R 3.000E 04 TO 3.000E 05 EV H 237
IMP-J -05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 3.000E 04 TC 3.000E 05 EV GH 243
EXPLORER 47 (72-073A-05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 3.000E 04 TC 3.000E 05 EV GH 111
ESGEO (ESGEO -01) PFCTZER ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	P. A. 000E 04 TO A. 000C 0E 5V
EXPLORER 43 (71-019A-06) ANDERSON MEDIUM-ENERGY SOLAF PROTONS AND	R 4.000E 04 TO 4.000E 05 EV F 206
ELECTRONS	R 4.000E 04 TO 4.000E 05 EV H 61
ISIS 1 (69-009A-04) MCDIARMID	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER	R RANGE OF MEASJREMENTS E MIN VALUE (F OR E) MAX REGION PLANET
DESCRIPTIVE EXPERIMENT TITLE	S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.2 SENGING PROTONS OR HYDROGEN IONS	
ENERGETIC PARTICLE DETECTORS	R 5.000E 04 TO 3.000E 07 EV DEF 27
EXPLORER 43 (71-019A-08) MCDUNALD SULAR AND GALACTIC COSMIC-RAY STUDIES	R 5.000E 04 TO 2.000E 06 EV FGH 63
FIONEER 10 (72-012A-12) MCDQNALD COSMIC-RAY SPECTRA	R 5.000E 04 TO 2.000E 07 EV H 96
FIGNEER 11 (73-019A-12) MCDGNALD COSMIC-RAY SPECTRA	R 5.000E 04 10 2.000E 07 EV H 136
EXPLORER 47 (72-073A-09) MCDCNALD SOLAR- AND COSMIC-RAY PARTICLES	R 5.000E 04 TO 5.000E 05 EV GH 113
IMP-J - CS) MCDONALD SOLAR- AND COSMIC-RAY PARTICLES	R 5.000E 04 TO 5.000E 05 EV GH 244
MARINER 77A (MARN77A-07) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	R 5.000E 04 TO 5.000E 05 EV H 5 273
MARINER 77E (MARN77B-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	R 5.000E 04 TO 5.000E 05 EV H 5 279
ESRO 4 (72-092A-03) HULTQUIST AURORAL PARTICLE SPECTROMETER	0 5.000E 04 TO 1.500E 05 EV C 121
PIGNEER 10 (72-012A-12) NCOGNALD COSMIC-RAY SPECTRA	R 5.000E 04 TO 8.000E 08 EV 5 96
FIGNEER 11 (73-015A-12) MCDGNALD COSMIC-RAY SPECTRA	R 5.000E 04 TO 8.000E 08 EV 5 136
ATS 5 (69-069A+04) MÖZER TRI-D1RECTIONAL MEDIUM-ENERGY PARTICLE DET ECTOR	R 6.000E 04 TO 1.650E 05 EV F 38
HELIOS-A (HELIO-A-08) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 05 TO 1.000E 06 EV H 226
HELIOS-8 (HELIO-8-08) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 05 TO 1.000E 06 EV H 231
MOTHER (MOTHER -10) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 1.000E 05 TO 3.800E 05 EV GH 287
DAUGHTER (DAUGHTR-08) ANDERSON ENERGETIC ELECTRONS AND PROTONS	R 1.000E 05 TO 3.800E 05 EV GH 200
ITOS-H (ITOS-H -04) SHENK SPACE ENVIRONMENTAL MONITOR (SEM)	R 1.500E 05 TO 1.500E 06 EV C 259

	SATELLITE NAME EXPERIMENT ID EXPERIMENTER	FIRANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANFT	
	DESCRIPTIVE EXPERIMENT TITLE	E MIN VALUE (F CR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M (	PAGE
ì	2.2 SENSING PROTONS OR HYDROGEN IONS		
,	ITOS-I (ITOS-I -04) SPACE ENVIRONMENTAL MONITOR (SEM)	R 1.500E 05 TO 1.500E 06 EV C	262
	ITOS-J (ITOS-J -04) SPACE ENVIRONMENTAL MONITOR (SEM)	R 1.500E 05 TO 1.500E 06 EV C	265
	MARINER 77A (MARN77A-08) VOGT HIGH- AND MODERATELY LOW-ENERGY		
	COSMIC-RAY TELES COPE	R 1.500E 05 TO 6.000E 06 EV H 5	274
	MARINER 77E (MARN77B-0E) VOGT HIGH- AND MODERATELY LOW-ENERGY		
	COSMIC-RAY TELESCOPE	R 1.500E 05 TO 6.000E 06 EV H 5	.580
	ESRO 4 (72-092A-05) LUST NORTHERN POLAR CAP SOLAR PARTICLE		
	SPECTROMETER	R 2.000E 05 TO 2.000E 06 EV C	122
	ATS-F -GE) MASLEY		
	SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	R 2.000E 05 TO 2.000E 06 EV F	192
	DAUGHTER (DAUGHTR-07) WILLIAMS ENERGETIC ELECTRONS AND PROTUNS	R 2.000E 05 TO 2.000E 06 EV DEFGH	100
ម្		WEIGH	199
	MOTHER (MOTHER -CS) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 2.000E 05 TO 2.000E 06 EV DEFGH	286
	EXPLORER 43 (71-019A-07) BOSTROM		
	MONITORING OF SOLAR PROTONS	R 2.000E 05 TC 2.000E 06 EV FGH	€2
	EXPLORER 47 (72-0734-08) KRIMIGIS PRUPAGATION CHARACTERISTICS OF SOLAR		
	PROTONS AND ELECTRONS	R 2.500E 05 TC 5.000E 08 EV GH	112
	IMP-J - CE) KRIMIGIS PROPAGATION CHARACTERISTICS OF SOLAR		
	PROTONS AND ELECTRONS	R 2.500E 05 TO 5.000E 08 EV GH	244
	EXPLORER 43 (71-019A-06) ANDERSON MEDIUM-ENERGY SOLAR PROTONS AND		
	ELECTRONS	U 2.500E 05 TO INFINITY H	61
	NOAA 2 (72-082A-01) BOSTROM		
	SOLAR PROTON MONITOR	R 2.700E 05 TQ 3.200E 06 EV BC	117
	(TOS-F -01) BOSTROM SOLAR PROTON MONITOR	R 2.700E 05 TO 3.200E 06 EV BC	251
			1
	ITUS-G (ITUS-G -01) BUSTRUM ( SOLAR PROTON MONITOR	R 2.700E 05 TO 3.200E 06 EV BC	254
	VELA 58 (69-046E-03) SINGER		

DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS	R 3.000E 05 TO 3.000E 06 EV GH 35
SOL AR PARTICLE TELESCOPES	A 24000E 02 12 24000E 02 E4 011
VELA 6A (70-027A-03) SINGER SDLAR PARTICLE TELESCOPES	R 3.000E 05 TO 3.000E 06 EV GH 48
VELA 68 (70-0278-03) SINGER SOLAR PARTICLE TELESCOPES	R 3.000E 05 TO 3.000E 06 EV GH 52
HELIQCENTRIC (+ELOCTR-08) ELLIGTT ENERGETIC PROTONS	R 3.000E 05 TO 1.400E 06 EV H 237
IMP-J - (IMP-J - 05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 3.000E 05 TO 1.000E 06 EV GH 243
EXPLORER 47 (72-073A-05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 3.000E 05 TO 1.000E 06 EV GH 111
ESGED (ESGEO -C1) PFOTZER  ELECTRON AND PROTON PITCH ANGLE  DISTRIBUTION	R 4.000E 05 TO 1.400E 06 EV F 206
EXPLORER 43 (71-019A-06) ANDERSCA MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	R 4.000E 05 TO 2.000E 06 EV H 61
PICNEER 10 (72-012A-02) SIMPSON CHARGED PARTICLE COMPOSITION	R 4.500E 05 TO 1.500E 06 EV H 5 91
PIONEER 11 (73-019A-02) SIMP SON CHARGED PARTICLE COMPOSITION	R 4.500E 05 TO 1.500E 05 EV H 5 132
EXPLORER 47 (72-073A-13) CLINE	·
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS	R 5.000E 05 TU 4.000E 06 EV GH 115
HELIOCENTRIC (HELOCTR-04) VON ROSENVING SULAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	0 5.000E 05 TO 4.000E 06 EV H 235
MOTHER (MOTHER -14) SIMPSGN MEDIUM-ENERGY COSMIC RAYS	R 5.000E 05 TO 5.000E 06 EV GH 288
EXFLORER 47 (72-073A-06) STONE ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	R 5.000E 05 TO 5.000E 06 EV GH 111
[MP-J - GE) STONE ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	R 5.000E 05 TD 5.000E 06 EV GH 243
EXPLORER 47 (72-073A-09) MCDUNALD SOLAR- AND COSMIC-RAY PARTICLES	R 5.000E 05 TO 5.000E 06 EV GH 113

· .	R RANGE OF MEASUREMENTS
SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	E MIN VALUE (F OR E) MAX REGION PLANET
2.2 SENSING PROTONS OR HYDROGEN IONS	
IMP-J -GS) MCDGNALD	
IMP-J -09) MCDCNALD SCLAR- AND COSMIC-RAY PARTICLES	R 5.000E 05 TO 5.000E 06 EV GH 244
MARINER 77A (MARN77A-G7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND	
TELESCOPE	R 5.000E 05 TO 5.000E 06 EV H 5 273
MARINER 77E (MARN77B-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND	
TELES COPE	R 5.000E 05 TO 5.000E 05 EV H 5 279
EXPLORER 43 (71-019A-05) FRANK	·
LOW-ENERGY PROTONS AND ELECTRONS	U 5.000E 05 TO INFINITY H 61
EXPLORER 43 (71-019A-08) MCDUNALD	·
SOLAR AND GALACTIC COSMIC-RAY STUDIES	R 5.000E 05 TO 4.000E 06 EV FGH 63
PIONEER 6 (65-10 EA-C3) FAN	
COSMIC-RAY TELES COPE	R 6.000E 05 TO 5.000E 05 EV H 5
PIONEER 7 (66-G7EA-C6) SIMPSON	
COSMIC-RAY TELESCOPE	R 6.000E 05 TO 6.000E 06 EV H 9
MARINER-J VENUS/MERCURY (MARINJ -07) SIMPSON	
ENERGET IC PART ICLES	R 6.000E 05 TO 6.000E 06 EV H 12 269
PIONEER 10 (72-012A-CE) FILLIUS	·
JOVIAN TRAPPED RADIATION	U 8.000E 05 TO 2.500E 08 EV H 5 92
PIGNEER 11 (73-G19A-GE) FILLIUS	
JOVIAN TRAPPED RADIATION	U 8.000E 05 TO 2.500E 08 EV H 5 133
HELIOS-A (HELIO-A-07) WIBBERENZ	
COSMIC-RAY PARTICLES	R 1.000E 06 TO 1.000E 07 EV H 226
HELIOS-B (HELIO-B-07) WIBBERENZ	,
CUSMIC-RAY PARTICLES	R 1.000E 06 TO 1.000E 07 EV H 231
SMS-B (SMS-B -01) WILLIAMS	
ENERGETIC PARTICLE MONITOR	R 1.000E 06 TO 1.000E 07 EV F 324
SMS-C (SMS-C -02) WILLIAMS	
ENERGET IC PART ICLE MONITOR	R 1.000E 06 TO 1.000E 07 EV F 328
PI ONEER 9 (68-100A-0E) MCCRACKEN	
COSMIC-RAY ANISOTROPY	R 1.000E 05 TO 8.000E 05 EV H 20
IMP-J (IMP-J -05) WILLIAMS	•
ENERGETIC ELECTRONS AND PROTONS	R 1.000E 05 TO 8.000E 06 EV GH 243
PIONEER 8 (67~123A-0E) MCCRACKEN	
COSMIC-RAY ANISOTROPY	R 1.000E 06 TO 8.000E 06 EV H 14

EXPERIMENT ID EXPERIMENTER

SATELLITE NAME

MEASUREMENTS

E MIN VALUE (F OR E) MAX REGION

PLANET

R RANGE DE

	•	R RANGE OF	ME ASUR EMENTS	
ATELLITE NAME D.E S.C. R I P T I V E	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE			
1.2 SENSING PROTONS OF				
er er er er er er er			1 1 1	
/ELA 58	(69-046E-03) SINGER			
SULAR PARTICLE TELES	COPES	R 3.000E 06 T	0 5.000E 07 EV	GH 35
and the second second				and the second of the second o
ÆLA SA. SOLAR PARTICLE TELES	(70-027A-03) SINGER	. R 3.000E 06 1	0 5.000E 07 EV	1
/ELA 68 SULAR PARTÍCLE TÉLES	(70-027B-03) SINGER	R 3+000E 06 1	0 5.000E 07 EV	GH 52
CIENERD 10	(72-012A-12) WCDCNALD			
COSMIC-RAY SPECTRA		R 3.000E 06 1	C 3.000E 07 EV	н .96
CIONEED 11	(75-019A-12) MCDGNALD			
	**************************************	R 3.000E 06 T	C 3.000E 07 EV	н 136
27.5.4. O	(72-082A-01) BOSTROM			
	**************************************	. U 3.200E 06 T	0 6.000E 07 EV	BC 117
	(ITCS-F -01) BOSTROM		the great of the second	
			C 6.000E 07 EV	BC 251
	* * * * * * * * * * * * * * * * * * * *			231
1705-G	(ITOS-G -01) BOSTROM	,		•
			G 6.000E 07 EV	BC 254
IONEER 8	(67-123A-05) MCCRACKEN	* * * * * * * * * * * * * * * * * * *	Service of the	,
-	Y	R 3.300E 06 T	0 6.700E 06 EV.	н 14
		A 1 1 10	5.0	•
	(68-100A-05) MCCRACKEN	. R 3.300E 06 T	0 6.700E 06 EV	н 20
PIONEER B	(67-123A-06) WEBBER		•	•
CUSMIC-RAY GRADIENT I	DETECTOR	. 'R 3.500E 06 T	C 1.100E 07 EV	Н 115
HELIBOENTRIC	(HELDCTR-04) VON ROSENVING			
SULAR, GALACTIC, AND	MAGNETOSPHERIC			•
ENERGETIC PARTICLES.	· · · · · · · · · · · · · · · · · · ·	R 4.000E 06 T	C 5.000E 08 EV	н "2'35
EXPLORER 47	(78-073A-05) MCDONALD			
SOLAR- AND COSMIC-RAY	Y PARTICLES	R 4.000E 05 T	C 2.000E 07 EV	GH 11,3
MP-J	(IMP-J -05) MCDCNALD			
SOLAR- AND COSMIC-RA	Y PARTICLES	R 4.000E 06 T	0 2.000E 07 EV	GH 244
HEL IOCENTRIC	(HELDCTR-04) VEN RESERVING			
SOLAR. GALACTIC. AND ENERGETIC PARTICLES.	MA GNETO SPHER IC	. 0 4.000E 06 T	0 8.000E 07 EV	H 2 <u>3</u> 5
** **				
	(71-019A-08) MCDCNALD DSMIC-RAY STUDIES	R 4.200E 06 T	0 1.910E 07 EV	FGH : 63
FIONEER 8	(67-1234-06) MCCRACKEN			
CUSMIC-RAY ANISOTROP		. R 4.500E 06 T	O 4.000E 07 EV	
	•			
-		· ·	- ,	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E min value (f or e) max region planet 5 max value (lambda) min abcdefghi/012345m page
2.2 SENSING PROTONS OR HYDROGEN IONS	
PIDNEER 9 (68-100A-05) MCCRACKEN COSMIC-RAY ANISOTROPY	R 4.500E 06 TO 4.000E 07 EV H 20
MOTHER (MOTHER -14) SIMESON MEDIUM-ENERGY COSMIC RAYS	R 5.000E 06 TC 5.000E 07 EV GH 288
EXPLORER 47 (72-073A-06) STONE ELECTRONS AND HYDRUGEN AND HELIUM ISOTOPES	R 5.000E 06 TO 4.000E 07 EV GH 111
190-1 (1MP-J -06) ST CNE	
ELECTRUNS AND HYCROGEN AND HELIUM ISCTOPES	R 5.000E 06 TO 4.000E 07 EV GH 243
MARINER 77A (MARN77A-07) KRINIGIS LUW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	R 5.000E 05 TC 3.000E 07 EV H 5 273
MARINER 77B (MARN778-07) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND	
TELES COPE	R 5,000E 06 TO 3,000E 07 EV H 5 279
PROTON ALPHA PARTICLE TELESCOPE	R 5.300E 06 TO 4.000E 07 EV EFGH 31
FIGNEER 6 (65-105A-03) FAN COSMIC-RAY TELESCOPE	R 6.000E 06 TO 1.390E 07 EV H 5
FIGNEER 7 (66-075A-06) SIMPSON COSMIC-RAY TELESCOFE	R 6.000E 06 TO 1.270E 07 EV H 9
MAFINER 77A (MARN 77A - CE) VOGT HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	R 6.000E 05 TO 3.000E 07 EV H 5 274
MARINER-J VENUS/MERCURY (MARINJ -07) SIMFSCN E NERGETIC PARTICLES	R 5.000E 06 TO 6.000E 07 EV H 12 269
EXPLORER 47 (72-073A-07) SIMPSON SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	R 5.000E 06 TO 5.000E 07 EV GH 112
MARINER 77 E (MARN778-08) VOGT HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	R 6.000E 06 TC 3.000E 07 EV H 5 280
IMP-J (IMP-J -07) SIMPSON SCLAR FLARE HIGH-Z/LOW-E AND LOW-Z	
EXPERIMENTS	R 6.000 E 06 TC 6.000 E 07 EV GH 244
HEOS 2 (72-005A-04) PAGE PARTICLE COUNTER TELESCOPE	R 6.200E 06 TO 3.300E 07 EV C GH 88

	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	R RANGE OF MEASUREMENT E MIN VALUE (FOR E) M/ S MAX VALUE (LAMEDA) M	AX REGION PLANES	
2.2 SENSING PROTONS OF	R HYDROGEN IONS			
PIONEER 7 COSMIC-RAY ANISOTROP	(66-075A-05) MCCRACKEN Y	U 7.200E 06 TO INFINITY	н	9
PIONEER 7 COSMIC-RAY ANISETREP	(66-075A-C5) MCCRACKEN	U 7.200E 06 TO 4.700E 07 E	/ н	9
PIONEER 6 COSMIC-RAY ANISOTROP	(EE-10EA-05) MCCRACKEN Y DETECTION	U. 7.400E 06 TO INFINITY	н	6
PIONEER 8 COSMIC-RAY ANISOTREP	(67-123A-05) MCCRACKEN	R 7.400E 06 TO 6.300E 07 EV	<b>и</b>	14
FIGNEER 6	(65-105A-05) MCCRACKEN	K 114002 00 10 013002 07 E1	П	14
	Y DETECTION	U 7.400E 05 TO 4.400E 07 EV	/ н	6
FIGNEER 9 CDSMIC-RAY ANISOTROP	(68-10GA-05) MCCRACKEN	R 7.400E 06 TO 6.300E 07 EV	<b>/</b> н	20
ESRO 4 .NORTHERN POLAR CAP SO SPECTROMETER	(72-052A-05) LUST DLAR PARTICLE	R 8.000E 06 TO 9.00DE 06 E	, c	122
EXPLORER 43 MONITORING OF SOLAR 9	(71-019A-07) BOSTRON PROTONS	U 1.000E 07 TO INFINITY	FGH	€2
PIONEER 10 JOVIAN CHARGED PARTIC	(72-012A-11) VAN ALLEN	U 1.000E 07 TC INFINITY	н	95
PIONEER 11 JOVIAN CHARGED PARTIC	(73-019A-11) VAN ALLEN CLES EXPERIMENT	U 1.000E 07 TO INFINITY	н	136
ATS-F	(ATS-F -07) BLAKE	P 1 0005 07 70 0 0005 07 5		× ·
HELIOS-A	(HELIO-A-07) WIBBERENZ	R 1.000E 07 TO 8.000E 07 EV	f f	192
		R 1.000E 07 TO 1.000E 08 EV	' н	226
HELIOS+B COSMIC-RAY PARTICLES	(HELIG-8-07) WIBBERENZ	R 1.000E 07 TO 1.000E 08 EV	' н	231
SMS-B ENERGETIC PARTICLE MC	(SMS-B -C1) WILLIAMS	R 1.000E 07 TO 1.000E 08 EV	F	324
SMS-C ENERGETIC PARTICLE MC	(SMS-C -C2) WILLIAMS	R 1.000E 07 TC 1.000E 08 EV	F	328
NOAA 2 SOLAR PROTON MONITOR	{72-082A-C1} BOSTROM	R 1.000E 07 TO 6.000E 07 EV	вс	117
MOTHER	(MCTHER -14) SIMPSON			

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS	
PIONEER 9 (68-10CA-06) WEBBER COSMIC-RAY TELESCOPE	R 1.000E 07 TO 4.200E 07 EV H 21
FIONEER 10 (72-012A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT.	U 1.000E 07 TO INFINITY 5 95
GOES-B (GOES-B -C2) WILLIAMS ENERGETIC PARTICLE MGNITOR	R 1.000E 07 TO 1.000E 08 EV F 216
GDES-C (GCES-C -C2) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 07 TO 1.000E 08 EV F 219
HELIOS-A (HELIO-A-08) TRAINGR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 07 TO 1.000E 08 EV H 226
HELIOS-B (HELIO-B-08) TRAINGR GALACTIC AND SOLAF COSMIC RAYS	R 1.000E 07 TO 1.000E 08 EV H 231
ITOS-F (ITOS-F -01) BOSTROM SGLAR PROTON MONITCR	R 1.000E 07 TO INFINITY BC 251
ITOS-G (ITOS-G -01) BOSTROM SOLAR PROTON MONITOR	R 1.000E 07 TO INFINITY BC 254
SMS-A (SMS-A -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 07 TO 1.000E 08 EV F 322
FIGNEER 11 (73-019A-11) VAN ALLEN JOVIAN CHARGED PARTICLES EXPERIMENT	U 1.000E 07 TO INFINITY 5 136
PIONEER 8 (67-123A-06) WEBBER COSMIC-RAY GRADIENT DETECTOR	R 1.100E 07 TG 5.400E 07 EV H 15
ATS 5 (69-069A-03) MC1LWAIN  OMNIDIRECTIONAL FIGH-ENERGY PARTICLE	R 1.200E 07 TO 2.400E 07 EV F 38
PIQNEER 7 (66-075A-C6) SIMPSON	R 1.270E 07 TO 7.300E 07 EV H 9
PICNEER 6 (65-105A-03) FAN	
ITOS-H (ITOS-H -04) SHENK	
SPACE ENVIRONMENTAL MONITOR (SEM)	R 1.500E 07 TO 1.500E 08 EV C 259
ITOS-I (ITOS-I -04) SPACE ENVIRONMENTAL MONITOR (SEM)	R 1.500E 07 TO 1.500E 08 EV C 262
ITOS-J (ITOS-J -04) SPACE ENVIRONMENT AL MONITOR (SEM)	R 1.500E 07 TO 1.500E 08 EV C 265
EXPLORER 43 (71-019A-08) MCDUNALD	

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	SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E min value (f or e) max region planet s max value (lambda) min abcdefghi/012345m page
	. 2.2 SENSING PROTONS OR HYDROGEN IONS	
	SOLAR AND GALACTIC COSMIC-RAY STUDIES	R 1-870E 07 TO 8-160E 07 EV FGH .63
	PIONEER 10 (72-012A-12) MCDONALD CUSMIC-RAY SPECTRA	R 2.000E 07 TD 2.000E 08-EV €-H 196
	ESRO 4 (72-092A-04) DE JAGER SOUTHERN POLAR CAF SOLAR PARTICLE SPECTROMETER	R 2.000E 07 TO 1.600E 08 EV C 122
	FIGNEER 11 (73-015A+12) MCDGNALD COSMIC-RAY SPECTRA	R' 2.000E 07, T 0: 2.000E. 08 EV . H . 136
	ATS-F (ATS-F -C6) MASLEY SCLAR COSMIC RAYS AND GEOMAGNETICALLY' TRAPPED RADIATION	R 2.000E 07 TO 3.000E 08 EV F 192
	EXPLORER 47 (72-073A-09) MCDUNALD SOLAR- AND COSMIC-RAY PARTICLES	R 2.000E 07 TO 8.000E 07 EV GH 113
	IMP-J - 05} MCDONALD SQLAR- AND CUSMIC-RAY PARTICLES	R 2.000E 07 TO 8.000E 07 EV GH 244
5	MARINER-J VENUS/MERCURY (MARINJ ÷07) SIMPSON ENERGETIC PARTICLES	R 2.000E 07 TO INFINITY H 12 269
ũ	VELA SA (69-0460-07) BAME NEUTRON DETECTOR	U 2.500E 07 TO INFINITY GH 33
	VELA SE (69-046E-07) BAME NEUTRON DETECTOR	U 2.500E 07 TO INFINITY GH 37
	VELA 6A (70-027A-07) BAME NEUTRUN DETECTOR	U 2.500E 07 TO INFINITY GH 50
	VELA 6B (70-0278-07) BAME NEUTRON DETECTOR	U 2.500E 07 TO INFINITY GH 53
	MARINER 77A (MARN77A-08) VOGT HIGH- AND MODERATELY LOM-ENERGY	Andrew Communication of the Co
	MARINER 776 (MARN778-08) VOGT	R 3.000E 07 TO 5.000E 08 EV H 5 274
	HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	R-3-000EQ7,T0,5-000E 08 EV FF H 5 280
	EXPLORER 43 (71-019A-07) BOSTROM MONITORING OF SOLAR PROTONS	U_3.000E_07.TO INFINITY FGH .62
	HELIOCENTRIC (HELOCTR-05) HECKMAN HIGH-ENERGY COSMIC RAYS	0 3.100E 07 TO 1.100E 08 EV H 236
	HELIDCENTRIC (HELOCIR-05) HECKMAN	

SATELLITE NAME EXPE		E MIN VALUE S MAX VALUE		MAX				AGE
2.2 SENSING PROTONS OR HYDR	OGEN IONS							
	LOCTR-06) MEYER	R 3.600E 07 TO	3.600E 08	EV	н			236
* * * * * * * * * * * * * * * * * * * *	-046B-03) YATES SCOPE	U 4.000E 07 T	1.000E 08	EV	EFGH			31
	-100A-06) WEBBER	R 4.200E 07 TO	3.200E 08	EV	н			21
	-10EA-05) MCCRACKEN CT 10N	U 4.400E 07 TE	7.700E 07	EV	H			6
	-075A-05) MCCRACKEN	U 4.700E 07 TO	6.500E 07	EV	н			9
	THER -14) SIMPSON	R 5.000E 07 TO	1.500E 08	ΕV	GН			288
	-012A-02) SIMPSCN ON	U 5.000E 07 TO	INFINITY		н	5	ı	91
	-015A-02) SIMPSON ON	U 5.000E 07 TC	INFINITY		н	5		132
	-012A-05) FILLIUS	U 6.000E 07 TE	2.500E 08	EV	н	5	i	92
	-01SA-05) FILLIES	U 6.000E 07 TO	2.500E 08	ΕV	н	5	i	133
	OS-F -C1) BOSTRON	U 6.000E 07 TO	INFINITY		вс			251
=	DS-G -01) BOSTACN	U 6.000E 07 TO	INFINITY		вс			254
	-082A-01) BCSTRCM	U 6.000E 07 TO	INFINITY		ас			117
MARINER-J VENUS/MERCURY (MA ENERGET IC PART ICLES	RINJ -07) SIMPECN	R 6.000E 07 TC	INFINITY		н	12		269
EXPLORER 47 (72 SQLAR FLARE HIGH-Z/LOW-E A ISOTOPE EXPERIMENT		R 6.000E 07 TO	3 6.000E 08	EV	GH			112
	-019A-07) BOSTROM	U 6.000E 07 TO	INFINITY		FGH			62
SOLAR FLARE HIGH-Z/LOW-E A	P-J -07) SIMPSON NO LOW-Z	R 6.000E 07 T	) <b>6.</b> 000E 08	٤٧	GН			244

R RANGE OF MEASUREMENTS

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS	•	
PIGNEER B (67-123A-06) WEBBER COSMIC-RAY GRADIENT DETECTOR	R 6.400E 07 TO 1.100E 08 EV H	15
PIONEER 7 (66-075A-05) MCCRACKEN COSMIC-RAY ANISOTROPY	U 6.500E 07 TO 8.100E 07 EV H	9
PIONEER 7 (66-075A-06) SIMPSON COSMIC-RAY TELESCOPE	R 7.300E 07 TO 1.600E 08 EV H	9
PIONEER 6 (65-105A-03) FAN COSMIC-RAY TELESCOPE	R 7.320E 07 TO 1.750E 08 EV H	5
EXPLORER 47 (72-073A-05) MCDCNALD SOLAR- AND COSMIC-RAY PARTICLES	R 8.000E 07 TO 5.000E 08 EV GH	113
IMP-J -09) MCDONALD SOLAR- AND COSMIC-RAY PARTICLES	R 8.000E 07 TO 5.000E 08 EV GH	244
EXPLORER 43 (71-019A-08) MCDCNALD SOLAR AND GALACTIC COSMIC-RAY STUDIES	R 8.000E 07 TO 5.000E 08 EV FGH	63
HELIOS-A (HELIO-A-07) WIBBERENZ COSMIC-RAY PARTICLES	R 1.000E 08 TG 1.000E 09 EV H	226
HELIOS-8 (FELIO-B-07) WIBBERENZ COSMIC-RAY PARTICLES	R 1.000E 08 TO 1.000E 09 EV H	231
SMS-B (SMS-B -01) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 08 TO 5.000E 08 EV F	324
SMS-C (SMS-C -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 08 TO 5.000E 08 EV F	328
GDES-B (GDES-B -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 08 TO 5.000E 08 EV F	216
GOES-C (GOES-C -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 08 TO 5.000E 08 EV F	219
SMS-A (SMS-A -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 1.000E 08 TO 5.000E 08 EV F	322
HELIOS-A (HELIO-A-08) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 08 TO 8.000E 08 EV H	226
HELIOS-B (HELIO-B-08) TRAINCR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 08 TC 8.000E 08 EV H	231
ITOS-H (ITOS-H +04) SHENK SPACE ENVIRONMENTAL MONITOR (SEM)	R 1.500E 08 TO 1.000E 09 EV C	259
ITOS-I (ITOS-I -04)		

	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	R RANGE OF E MIN VALUE S MAX VALUE		REGION PLANE ABCDEFGHI/012345	•
2.2 SENSING PROTONS OR	HYDROGEN IONS	•	,		
SPACE ENVIRONMENT AL M	ONITOR (SEM)	R 1.500E 08 TO	1.000E 09 EV	c,	262
ITOS-J SPACE ENVIRONMENTAL M	(ITOS-J -04) ON ITOR (SEM)	R 1.500E 08 T	1.000E 09 EV	С	265
PIONEER 7	(66-07EA-08) SIMPSON				
COSMIC-RAY TELESCOPE.	*************************	R 1.650E 08 TO	INFINITY	н	9
PIONEER 6	(65-105A-03) FAN				
CUSMIC-RAY TELESCOPE.	********************************	R 1.750E 08 TO	INFINITY	н	5
PIONEER 10	(72-012A-12) MCDONALD				
COSMIC-RAY SPECTRA	******************************	R 2.000E 08 TO	8.000E 08 EV	н	96
PIGNEER 11 COSMIC-RAY SPECTRA	(73-019A-12) MCDONALD	R 2.000E 08 TO	) 8.000E 08 EV	н	136
PIONEER 8 Cusmic-ray gradient d	(67-123A-06) WEBBER ETECTOR	R 2.800E 08 TO	) 2.200E 09 EV	н	15
PIONEER 9	(68-10CA-08) WEBBER				
COSMIC-RAY TELESCOPE.	***************************************	R 3.200E 08 TO	2.200E 09 EV	H	21
HELIOCENTRIC COSMIC-RAY ELECTRONS .	(HELOCTR-GE) MEYER AND NUCLEI	R 3.600E 08 TO	) 3.600E 09 EV	н	236
EXPLORER 47	(72-073A-07) SIMPSON				
SOLAR FLARE HIGH-Z/LOGISOTOPE EXPERIMENT	W-E AND LOW-Z	R 6.000E 08 T	1.200E 09 EV	GH	112
[MP-J SCLAR FLARE HIGH-Z/LO					
EXPERIMENTS	*************	R 6.000E 08 TO	1.200E 09 EV	GM	244
HELIOCENTRIC COSMIC-RAY ELECTRONS	(HELOCTR-06) MEYER AND NUCLEI	R 3.600E 09 TC	1.300E 10 EV	н	236
HELIOCENTRIC COSMIC-RAY ELECTRONS A	(HELOCTR-06) MEYER AND NUCLEI	U 1.300E 10 TO	) INFINITY	н	23 <del>6</del>
				4	

DESCRIPTIVE	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	, E	RANG MIN MAX	VAL	UE	MEAS (F. DR (LAMBO	E)	ENTS MAX MIN	REGION, ABCDEFGHIA	PLANET	
2.3 SENSING HELIUM NUC	LEI										
MP-J	(IMP-J -02) BRIDGE		٠,		ŕ						
	PLASMA	R	2.50	OE C	)1 To	3.500	E 03	E٧	GH	4	24
EXPLORER 47 MEASUREMENT OF SOLAR	(72-0734-02) BRIDGE	. و	5-00	ne d	Tr	7 000					
PIONEER 11	(73-019A-13) NO! FF					7.000E			GH.		10
PLASMA EXPERIMENT	***********	R	5.00	0E 0	1 TC	9.0006	E 03	ΕV	н		13
PIONEER 11	(73-019A-13) WDLES			,				6			. 3
	************************	R	5.00	0E 0	1 70	9.000	03	ÉV	••	5	13
FI ONEER 10	(78-012A-13) WOLFE										
PLROMA EXPERIMENT +	*************	R	1.000	0 E 0	2 TO	1.800	04	EV	Н		Š.
MEASUPEMENT OF SOLAD	(71-019A-11) BAME .				4.5						
MENDONEMENT BY SOCAR	PLASMA	R	1.00	OE O	2 TO	8.000E	03	EΥ	DEF GH		5
PIONEER 10	(72-012A-13) WOLFE										
PLASMA EXPERIMENT		, R	1.000	Œ O	2 TO	1.800E	04	ΕV		5	, <sub>2</sub> 9
VELA 6A	(70-027A-05) BAME					• •			•		, 2
SOLAR WIND EXPERIMENT		R	1.200	0E 0	2 TO	5.000E	03	ΕV	н		4
HELIOS-A	(HELIO-A-OS) ROSENBAUER										
PLASMA DETECTORS	**************************************					8.000E			,		
HEL 105-8		• • •		<b>.</b> .	_ 10	9.000	. 03	E. V	Н		22
	(HELIO-8-09) ROSENBAUER	_			<b></b> -	40.00	in p	-1.			
		. *	1.500	JE O	2 70	8.000E	03	Ēν	н		232
EXPLORER 47  MEASUREMENT OF SOLAD B	(72-073A-10) BAME					e .					
	•	R	2.000	DE O	2 TO	5.000E	04	E٧	ĞН		113
EXPLORER 47	(72-073A-12) OGILVIE		4								
SULAR WIND IDN COMPOSI	T 10N	R	3.000	ĎΕ O.	2 70	3.750E	03	ΕV	GН		115
EXPLORER 47	(72-073A-12) DGILVIE										
SOLAR WIND ION COMPOSE	T 10N	R	4.000	e o	2 70	3.750E	03	Ev	5 ° н		íıs
EXPLORER 45	(71-096A-02) FRITZ										
ZINC SULFIDE THIN-FILM	SCINTILLATOR	° A '	2.500	E O	T C	8.720E	05	ËV	DEF :		. ·, 85
	1 H 1 S								20.		05
LOW-ENERGY CHARGED PAR	(MARNY7A-07) KRIMIGIS TICLE ANALYZER AND	1 2				er til en en	5 ; I				
TELESCOPE	**********************	R	5.000	E 04	ro	5.000E	05	ΕV	н	5	273
	(MARN778-07) KRIMIGIS									-	_,,
. LOW-ENERGY CHARGED PAR	TICLE ANALYZER AND							,	. 1 "		٠.
TELESCOPE		R	5.000	E 04	To	5.000E	05	ΕV	н	5	279
IMP-J ENERGETIC ELECTRONS AN	(IMP-J -05) WILLIAMS D PROTONS	_			_						
							05 (	ΞV	∴ <u>i</u> GH	100	243
1		$S' = 1_{S}$	•	5		P .				e 4	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.3 SENSING HELIUM NUCLET	
EXPLORER 47 (72-073A-05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	R 1.200E 05 TO 5.500E 05 EV GH 111
ATS-F -06) MASLEY SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	R 3.000E 05 TO 3.000E 06 EV F 192
HELIOCENTRIC (HELOCTR-08) ELLIOTT ENERGET IC PROTONS	R 3.500E 05 TO 1.500E 06 EV H 237
EXPLORER 47 (72-073A-05) . WILLIAMS ENERGETIC ELECTRONS AND PROTONS	U 5.000E 05 TO 2.200E 06 EV GH 111
VELA 5B (69-046E-03) SINGER SOLAR PARTICLE TELESCOPES	R 5.000E 05 TO 2.500E 06 EV GH 35
VELA 6A (70-027A-03) SINGER SOLAR PARTICLE TELESCOPES	R 5.000E 05 TO 2.500E 06 EV GH 48
VELA 6E (70-0278-03) SINGER SOLAR PARTICLE TELESCOPES	R 5.000E 05 TO 2.500E 05 EV GH 52
HELIDCENTRIC (HELDCTR-04) VON ROSENVING SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	R 5.000E 05 TO 5.000E 08 EV H 235
EXPLORER 47 (72-073A-06) STONE ELECTRONS AND HYCROGEN AND HELIUM ISOTOPES	R 5.000E 05 TG 5.000E 06 EV GH 111
[MP-J - CE) STONE ELECTRONS AND HYCROGEN AND HELIUM ISOTOPES	R 5.000E 05 TO 5.000E 06 EV GH 243
IMP-J -05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	U 5.000E 05 TO 2.200E 06 EV GH 243
MOTHER (MOTHER -14) SIMPSON MEDIUM-ENERGY COSMIC RAYS	R 5.000E 05 TO 5.000E 06 EV GH 288
MARINER 77A (MARN77A-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELES COPE	R 5.000E 05 TO 5.000E 05 EV H 5 273
MARINER 77B (MARN778-07) KRIMIGIS LOW-ENERGY CHARGED PART ICLE ANALYZER AND TELES COPE	R 5.000E 05 TO 5.000E 06 EV H 5 279
PIONEER 6 (65-10EA-03) FAN COSMIC-RAY TELESCOPE	R 6.000E 05 TO 5.000E 05 EV H S
PIONEER 7 (66-07EA-06) SIMPSON COSMIC-RAY TELESCOPE	R 6.000E 05 TO 1.300E 07 EV H 9

	TELLITE NAME ESCRIPTIVE		EXPERIMENTER ENT TITLE		VALUE		)	MAX	REGION F ABCDEFGHI/01	PLANET 12345M PAGE
2.	3 SENSING HELIUM NUCL	EI								
	ELIOS-A COSMIC-RAY PARTICLES.	(HELID-A-07)	WISSERENZ	. R 1.000	E 06 TO	1.000E	07	ΕV	<b>H</b> -	226
	ELIOS-B COSMIC-RAY PARTICLES•	( HEL IO-8-07)	wieberenz	R 1.000E	E 06 TO	1.000E	07	Ε¥	, <b>н</b>	231
EX		(71-019A-07)	BOSTROM						FGH	€2
EX	(PLURER 47 PROPAGATION CHARACTER:	(72-073A-08)	KRINIGIS		*				7 411	(2
	PROTONS AND ELECTRONS	•••••••••••		• R 2.0006	E 06 TO	2.000E	08	EV	GH	112
	IP-J PROPAGATION CHARACTER! PROTONS AND ELECTRONS:	(IMP-J -08) ISTICS OF SOLAR		• R 2.000E	: 06 <b>T</b> O	2.000€	08	E۷	GH	244
	PLORER 47 ENERGETIC ELECTRONS AN	(72-073A-05) ND PROTONS	WILLIAMS	. U 2.200E	6 06 TO	8.800E	06	EV	GH.	111
	IP-J ENERGETIC ELECTRONS AN	(IMP-J -05) (D PROTONS	WILLIAMS	• U 2•2006	. 06 TO	8.800E	06	E <b>∀</b>	gн	243
Š	RO 4 SOUTHERN POLAR CAP SOL SFECTROMETER	(72-092A-04) AR PARTICLE		• R 2•500E	: D6 TE	2.000E	07 i	€V	c ·	122
	RO 4 NORTHERN POLAR CAP SOL	(72-092A-05) AR PARTICLE								
	SPECTROMETER			. R 2.500E	06 TO	2.400E	07 E	€V	¢	122
	5-6 PROTON ALPHA PARTICLE	(69-0468-03) TELESCOPE	YA TE S	R 2.500E	06 TO	2.500E	0 <b>7</b> E	ΞV	EF GH	31
	LA 58 Solar Particle Telesco	(65-046E-03) PES	SINGER	• R 2.500E	06 TO	2.500E	07 E	ΞV	GН	35
	LA 6A Solar particle telesco	(70-027A-03) PE5+++++++	SINGER	• R 2.500€	06 TO	2.500E	0 <b>7</b> E	EV	GH	48
	LA 68 SOLAR PARTICLE TELESCO	(70-0278-03) PES	SINGER	• R 2.500E	05 TO	2.500E	0 <b>7</b> 6	ΞV	GH	52
	OS-G SOLAR PROTON MUNITCR	(ITDS-G -01)	BOSTROM	• U 3.000E	06 TO	8.000E	06 E	EV	вс	254
I T C	OS-F	(ITOS-F -01)	BOSTROM					_		
	SOLAR PROTON MONITOR	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	U 3.000E	06 10	8.000E	00 F	. V	BC	251

SATELLITE NAME EXPERIMENT ID EXPERIMENTER . DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E min value (f or e) max region planet S max value (lambda) min abcdefghi/012345m page
2.3 SENSING HELIUM NUCLEI	
ATS-F -06) NASLEY SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	R 3.000E 06 TO 4.500E 07 EV F 192
GOES-B (GOES-B -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 4.000E 05 TO 4.000E 07 EV F 216
GOES-C (GOES-C -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 4.000E 05 TO 4.000E 07 EV F 219
SMS-A (SMS-A -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 4.000E 05 TO 4.000E 07 EV F 322
SMS-B (\$MS-B -01) WILLIAMS. ENERGETIC PARTICLE MONITOR	R 4.000E 05 TO 4.000E 07 EV F 324
SMS-C (SMS-C -02) WILLIAMS ENERGETIC PARTICLE MUNITOR	R 4.000E 05 TO 4.000E 07 EV F 328
PIONEER B (67-123A-05) MCCRACKEN COSMIC-RAY ANISOTROPY	U 4.000E 05 TO 8.000E 05 EV H 14
PIONEER 9 (68-10GA-05) MCCRACKEN COSMIC-RAY ANISOTROPY	U 4.000E 06 TO 8.000E 06 EV H 20
HELIOCENTRIC (HELOCTR-04) VON ROSENVING SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	0 4.000E 06 TO 8.000E 07 EV H 235
EXPLORER 47 (72-073A-06) STONE ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	R 5.000E 06 TO 4.000E 07 EV GH 111
IMP-J -06) STONE ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	R 5.000E 05 TD 4.000E 07 EV GH 243
MOTHER -14) SIMPSON MEDIUM-ENERGY COSMIC RAYS	R 5.000E 06.TO 5.000E 07 EV GH 288
MARINER 77A (MARN77A-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	R 5.000E 06 TO 3.000E 07 EV H 5 273
MARINER 77B (MARN77B-07) KRINIGIS LOW-ENERGY CHARGEC PARTICLE ANALYZER AND TELESCOPE	R 5.000E 05 TO 3.000E 07 EV H 5 279
PIONEER 9 (68-100A-06) WEBBER COSMIC-RAY TELESCOPE	R 5.800E 06 TO 4.200E 07 EV H 21
IMP-J -07) SIMPSON SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z	

SATELLITE NAME DESCRIPTIVE	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	R RANGE E MIN S MAX	ALUE	(F OR E	EMENTS MAX MIN	REGION	PLANET 12345M PAGE	
2.3 SENSING HELIUM NUC	CLE I							
EXPERIMENTS	• • • • • • • • • • • • • • • • • • • •	R 6.0001	06 T	G 6.000E	07 EV	GH `	244	
PIONEER 6 COSMIC-RAY TELESCOPE	NAT (E0-A201-26)	R 6.000E	. 06 Ti	) 1.390E	07 EV	н	5	
SOLÁR FLÁRE HÍGH-ZZLO	(72-073A-07) SIMPSON DW-E AND LOW-Z			3 6.000E			112	
PIONEER "8 COSMIC-RAY GRADIENT I	(67-123A-06) WEBBER DETECTOR	R 64600E				н	15	
HEOS 2	(72-005A-04) PAGE ESCUPE	R 9.000€					ˈea	
HELIOS-A COSMIC-RAY PARTICLES	(HELIO-A-07) WIBBERENZ			1.000E		, -	226	
HELIOS-E	(HELIO-8-07) WIBBERENZ		,	1.000E	•	14	231	
MÖTHER	(MOTHER -14) SIMPSON	. "	* ;	1.500E	(. /	7,	268	
PLONEER 7	(66-078A-06) SIMPSON	R 1.3008		3 7.000€	07 EV		9	٨
COSMIC-RAY TELESCOPE	NAR (E0-A201-23)			7.320E		, <b>H</b> ,		
SOUTHERN POLAR CAP SO	(72-092A-04) DE JAGER DLAR PARTICLE	R 2.000E	: 07 †¢	1.600E		c	122	
ESRD 4 NORTHERN POLAR CAP SO	(72-092A-05) LUST LAR PARTICLE							
HELLI OCENTRI C	(HELOCTR-OS) HECKMAN	R 2.400E	07 TC	2.400E	08 EV	c	122	
HELLIOCENTRIC	(HELDCTR-GE) HECKMAN			1.000E		, <b>H</b>	23,6	
HIGH-ENERGY COSMIC RA	Y S			1.000E			236	
COSMIC-RAY ANISOTROPY	DETECTION	U 3.100E	0 <b>7</b> TO	7.600E	07 EV	, , <b>H</b>	<b></b>	
ENERGETIC PARTICLE MO	(GGES-C -02) WILLIAMS	R 4.000E	07 TO	4.000E	08 EV	F	216	
ENERGETIC PARTICLE MO	NITOR.	R 4.000E	Q7 TC	4.000E	08 EV		219	

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.3 SENSING HELIUM NUCLEI	
SMS-A (SMS-A -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 4.000E 07 TO 4.000E 08 EV F 322
SMS-B (SMS-B +01) WILLIAWS ENERGETIC PARTICLE MONITOR	R 4.000E 07 TD 4.000E 08 EV F 324
SMS-C (SMS-C -02) WILLIAMS ENERGETIC PARTICLE MONITOR	R 4-000E 07 TO 4-000E 08 EV F 328
MOTHER (MOTHER +14) SIMPSON MEDIUM-ENERGY COSMIC RAYS	R 5.000E 07 TO 1.500E 0B EV GH 288
IMP-J (IMP-J C7) SIMPSON  SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z  EXPERIMENTS	R 6.000E 07 TO 5.000E 08 EV GH 244
EXPLORER 47 (72-073A-07) SIMPSON SCLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISCTORE EXPERIMENT	R 6.000E 07 TO 6.000E 08 EV GH 112
PIONEER 7 (66-07EA-06) SIMPSON COSMIC-RAY TELESCOPE	R 7.000E 07 TO 1.780E 08 EV H 9
FIONEER 6 (65-105A-03) FAN COSMIC-RAY TELESCOPE	R 7.320£ 07 TO 1.750E 08 EV H 5
HELIOS-A (HELIO-A-O7) WIBBERENZ COSMIC-RAY PARTICLES	R 1.000E 08 TO 1.000E 09 EV H 226
HELIOS-B (HELIO-8-07) WIBBERENZ COSMIC-RAY PARTICLES	R 1.000E 08 TO 1.000E 09 EV H 231
ESRO 4 (72-092A-05) LUST NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	R 2.400 E 08 TO 3.600 E 08 EV C 122
[MP-J -C7] SIMPEON  SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z  EXPERIMENTS	R 6.000E 08 TO 1.200E 09 EV GH 244
EXPLORER 47 (72-073A-07) SIMPSON SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	R 6.000E 08 TO 1.200E 09 EV GH 112

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SATELLITE NAME	EXPERIMENT ID EXPERIMENTER EEXPERIMENT TITLE	R RANGE OF MEASUREM E MIN VALUE (F OR E)	MAX REGION PLA	NET
	•	S MAX VALUE (LAMBDA)	MIN ABCDEFGHI/0123	MASM PAGE
2.4 SENSING OTHER PAR	CITCLE SPECIES			
ISIS 1 CYLINDRICAL ELECTRO	(69-009A-07) BRACE DSTATIC PROBE	U THERMAL ENERGIES	c	27
131S 2	(71-024A-06) HOFFMAN			
ION MASS SPECTROMET	TER	U THERMAL ENERGIES	вс	70
ISIS 2 REFARDING POTENTIAL	(71-024A-08) MAIER - Analyzer	U THERMAL ENERGIES	c	71
APOLLO IS LM/ALSEP	(71-063C-05) BATES		•	
LUNAR DUST DETECTOR		u .	н	M 79
PIONEER 10	(72-012A-10) KLIORE		-	
	***************************************	U THERMAL ENERGIES	e e e e e e e e e e e e e e e e e e e	5 95
ESRO 4	(72-092A-01) BOYD			
POSITIVE ION SPECT	OMETER	U THERMAL ENERGIES	вс	120
PIONEER 11	(73-019A-10) KLIDRE	•	•	
	***************************************	U THERMAL ENERGIES	•	5 135
AE-D	(AE-C -C1) BRACE			
ELECTRON TEMPERATUR	RE AND CONCENTRATION	U THERMAL ENERGIES	С	159
AEROS-E MASS SPECTROMETER (	(AEROS-B-01) KRANKOWSKY	U THERMAL ENERGIES	ВС	178
AEROS-E ENERGY DISTRIBUTION	(AEROS-E-02) SPENNER			
	************************	U THERMAL ENERGIES	c	178
EXQS-A	(EXOS-A -01) UNKNOWN	•		
I ONOS PHERIC PROBES .	******************************	U THERMAL ENERGIES	С	209
EXOS-8	(EXDS-B - C1) UNKNOWN			
MAGNETOSPHERIC PLAS	MA PROBE	R THERMAL ENERGIES	DE	211
EXOS-C	(EXDS-C +04) UNKNOWN	S 0.2	•	
ENERGETIC PARTICLES	**********************	o	8	213
ISS ION MASS SPECTROMET	(ISS -C4) FUGONO	U THERMAL ENERGIES	вс	25.0
·	•	- HIGHWAL ENCHALES	BC .	250
MARINER 778 COMERENT S- AND X-B				
S-BAND RECEIVER	• • • • • • • • • • • • • • • • • • • •	U THERMAL ENERGIES		5 277
MOTHER	(MOTHER -12) SHARP		•	
	**************************************	R THERMAL ENERGIES	· <b>f H</b>	286
PIONEER VENUS PROBE A	(PIO76PA-G2) TAYLOR, JR.	II TUUGHAN GARBEREE		
. WIT MADO GECTRUME!		U THERMAL ENERGIES	2	301

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREM E MIN VALUE (F OR E) S MAX VALUE (LAMBDA)	MAX REGION	PLANET 12345M PAGE
2.4 SENSING OTHER PARTICLE SPECIES	•		- •
SRATS (SRATS -07) FUGGNO I ONI C COMPOSITION	U THERMAL ENERGIES	В	-332
VIKING-B (VIKNG-B-04) NIER ATMOSPHERIC COMPOSITION	U THERMAL ENERGIES		4 349
ISIS 1 (69-009A-08) SAGALYN SPHERICAL ELECTROSTATIC ANALYZER	U THERMAL ENERGIES	<b>8</b> C	<b>28</b>
ISIS 2 (71-C24A-C7) BRACE CYLINDRICAL ELECTROST AT IC PROBE	U THERMAL ENERGIES	c	71
AE-C (AE-C -01) BRACE ELECTRON TEMPERATURE AND CONCENTRATION	U THERMAL ENERGIES	c	148
AE+C (AE-C -C4) HANSCH ION TEMPERATURE	U THERMAL ENERGIES	С	149
AE-C (AE-C -10) HOFFWAN MAGNETIC ION-MASS SPECTROMETER	U THERMAL ENERGIES	В	153
AE-C (AE-C -11) BRINTON BENNETT ION-MASS SPECTROMETER	U THERMAL ENERGIES	8	154
AE-D (AE-D -04) HANSON ION TEMPERATURE	U THERMAL ENERGIES	С	160
AE-D (AE-D -1c) HOFFMAN  ION COMPOSITION AND CONCENTRATION	U THERMAL ENERGIES	BC	164
AE-E (AE-E -C1) BRACE ELECTRON TEMPERATURE AND CONCENTRATION	U THERMAL ENERGIES	В	169
AE-E (AE-E -C4) HANSON ION TEMPERATURE	U THERMAL ENERGIES	8	170
AE-E (AE-E -10) BRINTON IGN COMPOSITION AND CONCENTRATION	U THERMAL ENERGIES	8	174
EXOS-A (EXOS-A -01) UNKNOWN: ICNOSPHERIC PROBES	U THERMAL ENERGIES	c	209
ISS - 03) MIYAZAKI RETARDING POTENTIAL PROBE	U THERMAL ENERGIES	<b>B</b>	250
SRATS (SRATS -OE) UNKNOWN PLASMA DIAGNOS IS	U .	В	331
VIKING-A (VIKNG-A-04) NIER ATMOSPHERIC COMPOSITION	U THERMAL ENERGIES		4 341
VIKING-A (VIKNG-A-14) MICHAEL, JR. RADIO COMMUNICATION AND RADAR LANDING			, , , ,
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ATELLITE NAME	ENGERT IN THE TAX TO T	A RANGE OF					
DESCRIPTIVE	EXPERIMENT ID EXPERIMENTER EXPERIMENT TITLE	E MIN VALUE S MAX VALUE	(F OR E) (LAMBDA)	MAX Min	REGION P ABCDEFGH1/01	LANET 2345M	PAGE
2.4 SENSING OTHER PARTI	CLE SPECIES						•
SYSTEMS PLUS X BAND.	• • • • • • • • • • • • • • • • • • • •	υ	•		н	4	346
/IKING-E RADIO COMMUNICATION A	(VIKNG-8-14) MICHAEL, JR. And Radar Landing						
	************	U			н ,	4	353
MARINER 77 A COHERENT 5 - AND X-BAN	(MARN77A-02) ESHLEMAN	:					
	•••••••	U				5	271
EXOS-B	(EXOS-B -04) UNKNOWN		,				
		U 1.000E-01 T	D 1.000E 0	00 EV	DE		211
APOLLO 12 LM/ALSEP SUPRATHERMAL ION DETE	(69-099C-05) FREEMAN	8 2.000F-01 T	n Alasof d	1 EV	GН		42
•	(71-008C-06) FREEMAN		J 41000E 0		GH		42
SUPRATHERMAL ION DETE	ECTOR	R 2.000E-01 T	0 4.860E 0	1 EV	GH*		<b>57</b>
POLLO 15 LM/ALSEP SUPRATHERMAL ION DETE	(71-063C-05) FREEMAN	B 2 0005-of #4					
HEL TOCENT RIC	·	K 24000E-01 1	3 <b>4.</b> 030E 0	T EA	GH	М	78
MASS SPECTROMETER FOR	(HELOCTR-11) DGILVIE R 470 TO 10.500 EV 5.6 AMU PER CHARGE	D 4 7005 04 7					
	•	R 4.700E-01 10	1.050E 0	4 EV	H.		238
SGEO LOW-ENERGY ION COMPOS	(ESGEO -03) GEISS	0 1.000E 00 TO	1.720E 0	4 EV	F		206
MARINER 77A	(MARN77A-06) BRIDGE		,		•		200
PLASM A	***********************	R 5.000E 00 TO	1.000E 0	3 EV	н	5	273
ARINER 778	(MARN778-06) BRIDGE				•		•
PLASMA	**************************	R 5.000E 00 TU	1.000E 0	3 EV	н	5	279
SUPRATHERMAL ION DETE	(69-099C-05) FREEMAN	R 1.000E 01 TO	3.500E 0	3 EV	GH		42
MP-J	(IMP-J -1C) BAME				•	,	
MEASUREMENT OF SOLAR	PL ASMA	R 1.000E 02 TO	2.500E 0	3 EV	GH		245
	(71-006C-06) O'BRIEN R ENVIRONMENT		2 -000E 0	<b>オ E</b> V	GН	м	58
XPLORER 47	(72-073A-10) BAME			J	<b>3</b> 11	M	36
	PLASMA	R 2.000E 02 TO	2.000E 0	4 EV	GH		113
EOS 2	(72-005A-06) ROSENBAUER		•				
SOLAR WIND MEASUREMEN	TS (230 EV-16 KEV)	R 2.300E 02 TO	1.000E 0	3 EV	с вн		89

	SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGIJN PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
	2.4 SENSING OTHER PARTICLE SPECIES	
	EXPLORER 43 (71-019A-11) BANE MEASUREMENT OF SOLAR PLASMA	R 9.000E 02 TO 8.000E 03 EV DEFGH 64
	VELA 6A (70-027A-05) BAME SOLAR WINE EXPERIMENT	R 1.000E 03 TO 8.300E 03 EV H 49
	HEOS 2 (72-005A-06) ROSENBAUER SOLAR WIND MEASUREMENTS (230 EV-16 KEV)	R 1.000E 03 TO 1.000E 04 EV C GH 89
	APOLLO 14 LM/ALSEP (71-0080-08) G*BRIEN CHARGED PARTICLE LUNAR ENVIRONMENT	R 2.000E 03 TO 2.000E 04 EV GH M 58
	HELIOCENTRIC (HELOCTR-03) HOVESTADT LOW-ENERGY COSMIC-RAY COMPOSITION	R 5.000E 03 TO 5.000E 04 EV H 235
	MOTHER (MOTHER -CE) HOVESTADT LOW-ENERGY COSMIC-RAY COMPOSITION	R 5.000E 03 TO 5.000E 04 EV GH 284
	HEDS 2 (72-005A-06) ROSENBALER SOLAR WIND MEASUREMENTS (230 EV-16 KEV)	R 1.000E 04 TO 5.000E 04 EV C GH 89
	MARINER 77A (MARN77A-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCUPE	R 1.000E 04 TO 1.000E 05 EV H 5 273
576	MARINER 77E (MARN 77B-C7) KRIMIGIS LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELES COPE	R 1.000E 04 TO 1.000E 05 EV H 5 279
	HELIOCENTRIC (HELUCTR-03) HOVESTADT LUM-ENERGY COSMIC-RAY COMPOSITION	R 5.000E 04 TO 5.000E 05 EV H 235
	MOTHER (MOTHER -05) HOVESTADT LOW-ENERGY COSMIC-RAY COMPOSITION	R 5.000E 04 TO 5.000E 05 EV GH 284
	EXPLORER 47 (72-073A-13) CLINE STUDY OF COSMIC-RAY, SQLAR, AND MAGNETOSPHERIC ELECTRONS	R 5.000E 04 TO 5.000E 05 EV GH 115
	EXPLORER 47 (72-073A-03) GLOECKLER IDNS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV	R 1.000E 05 TO 1.000E 06 EV GH 110
	IMP-J -03) GLOECKLER SOLID-STATE DETECTORS	R 1.000E 05 TC 1.000E 06 EV GH 242
	HELIOS-A (HELIO-A-08) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 05 TG 1.000E 06 EV H 226
	HEL 105-B (HEL 10-8-08) TRA[NOR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 05 TO 1.000E 06 EV H 231
	MARINER 77A (MARN77A~07) KRIMIGIS	

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SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M PAGE
2.4 SENSING OTHER PARTICLE SPECIES	. •
LDM-ENERGY CHARGED PARTICLE ANALYZER AND TELESCUPE	
MARINER 77E (MARN 77B-C7) KRIMIGIS LUW-ENERGY CHARGED PARTICLE ANALYZER AND TELES COPE	R 1.000E 05 TO 3.000E 07 EV H 5 275
MARINER 778 (MARN778-08) VGGT HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	R 1.500E 05 TO 6.000E 06 EV H 5 280
MARINER 77 A (MARN77A-08) VOGT	1 3 200 H
HIGH- AND MODERATELY LOW-ENERGY CUSMIC-RAY TELESCOPE	R 1.500E 05 TC 6.000E 06 EV H 5 274
EXPLORER 43 (71-019A-09) SIMPSON NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	R 5-000E 05 TC 5-000E 06 EV H 63
EXPLURER 47 (72-072A-07) SIMPSON SCLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	R 5.000E 05 TD 5.000E 06 EV GH 112
IMF-J - 07) SIMPSON SCLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	R 5.000E 05 TE 5.000E 06 EV GH 244
HELIOCENTRIC (HELOCTR-03) HOVESTADT LOW-ENERCY COSMIC-RAY COMPOSITION	R 5.000E 05 TC 2.000E 05 EV H 235
MOTHER (MOTHER -05) HOVESTADT LUW-ENERGY COSMIC-RAY COMPOSITION	R 5.000E 05 TO 2.000E 06 EV GH 284
HELIUCENTRIC (HELOCTR-04) VON ROSENVING SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	R 5.000E 05 TO 5.000E 08 EV H 235
EXPLORER 47 (72-073A-13) CLINE STUDY OF COSMIC-RAY, SOLAR, AND	
EXPLORER 43 (71-019A-09) SIMPEGN	R 5.000E 05 TD 2.000E 06 EV GH 115
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	R 5.000E 05 TC 8.000E 08 EV H 63
TO 1A (72-014A-03) LABEYRIE SPECTROMETRY OF PRIMARY CHARGED PARTICLES	0 1.000E 06 TO INFINITY CD 99
EXPLORER 47 (72-073A-03) GLOECKLER IONS AND ELECTRONS IN THE ENERGY RANGE	D 1 000F 05 TO 0 000F 05 FN 5H
0.1 TO 2 MEV	R 1.000E 06 TO 2.000E 05 EV GH 110

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	R RANGE OF MEASUREMENTS E min value (f or e) max region planet S max value (lambda) min abcdefghi/012345m page
2.4 SENSING OTHER PARTICLE SPECIES	
IMP-J -03) GLOECKLER SQLID-STATE DETECTORS	R 1.000E 05 TO 2.000E 05 EV GH 242
HELIOS-A (HELIO-A-08) TRAINOR GALACTIC AND SOLAR COSMIC RAYS	R 1.000E 06 TO 1.000E 07 EV H 226
HELIOS-E (HELIO-8-C8) TRAINGR GALACTIC AND SCLAR COSMIC RAYS	R 1.000E 06 TO 1.000E 07 EV H 231
HELIUCENT FIC (FELOCIR-12) STONE COSMIC-RAY COMPOSITION	R 2.000E 06 TO 2.000E 07 EV H 239
HEL 10CENTR1C (HELOCTR-03) HOVESTADT LOW-ENERGY COSMIC-RAY COMPOSITION	R 2.000E 06 TC 2.000E 07 EV H 235
MOTHER - COS H GVESTADT  LOW-ENERGY COSMIC-RAY COMPOSITION	R 2.000E 06 TO 2.000E 07 EV GH 284
PIONEER 10 (72-G12A-12) MCDGNALD COSMIC-RAY SPECTRA	R 3.000E 06 TO 3.000E 07 EV H 96
PIONEER 11 (73-019A-12) MCDONALD COSMIC-RAY SPECTRA	R 3.000E 06 TO 3.000E 07 EV H 136
FIGNEER 10 (72-012A-12) MCDChALD COSMIC-RAY SPECTRA	R 3.000E 06 TO 2.000E 08 EV 5 96
PIONEER 11 (73-019A-12) MCDDAALD COSMIC-RAY SPECTRA	R 3.000E 06 TO 2.000E 08 EV 5 136
EXFLORER 47 (72-073A-05) MCDDAALD SOLAR- AND COSMIC-RAY PARTICLES	R 4.000E 06 TO 2.000E 07 EV GH 113
IMF-J -05) NCDChALD SOLAR- AND COSMIC-RAY PARTICLES	R 4.000E 06 TO 2.000E 07 EV GH 244
EXPLORER 43 (71-019A-08) MCDONALD SOLAR AND GALACTIC COSMIC-RAY STUDIES	R 4.200E 06 TO 1.910E 07 EV FGH 63
EXPLORER 43 (71-019A-09) SIMPSON NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	R 5.000E 06 TO 5.000E 07 EV H 63
EXPLORER 47 (72-073A-07) SIMPSON SGLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	R 5.000E 06 TG S.000E 07 EV GH 112
IMP-J -07) SIMPSON SGLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	R 5.000E 05 TO 5.000E 07 EV GH 244
EXPLORER 47 (72-073A-05) WILLIAMS ENERGETIC ELECTRONS AND PROTONS	U 5.000E 06 TO INFINITY GH 111

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2.4 SENSING OTHER PARTI	CLE SPECIES				
	*•				
IMP-J Energetic Electrons A	(IMP-J -05) WILLIAMS	U 5.000E 06.T(	D. INFINITY	GH	243
MARINER 77E HIGH- AND MODERATELY	(MARN778-08) VOGT LOW-ENERGY				. 240
	***************************************	R 6.000E 06 TO	3.000E 07 EV	н	5 280
FIGNEER 10 CHARGED PARTICLE COMP	(72-G12A-G2) SIMPSON	R 6.000E 06 TO	6.000E 07 EV	н	5 91
PIONEER 11 CHARGED PARTICLE COMP	ADSTRUCT (20-A019-C7)		6.000E 07 EV	· .	
	(MARN77A-08) VDGT			н	5 132
MIGHT AND MODERATELY (	OW-ENERGY		No. 1	•	•
12230072	*************		3.000E 07 EV	н	5 274
PROPAGATION CHARACTER:	(72-072A-08) KRIMIGIS ISTICS OF SOLAR				•
. HOLDIO HILD EEECH KONS	••••••••••	R 8.000E 06 TO	1.360E,08 EV	GH	112
INDUMBRIEDA CHARACTER	(IMP-J -08) KRIMIGIS ISTICS OF SOLAR	R 8.000E 05 TO	N. W. T. W. W. W. T. W. W. T. W. W. T. W. W. T. W. W. W. T. W. W. W. W. W. T. W. W. W. W. W. T. W.		÷ '
				<b>GH</b>	244
HIGH-ENERGY COSMIC RAY	(HELOCTR-05) HECKMAN	D 1.000E 07 TO		H	236
HELIOS-B GALACTIC AND SOLAR COS	(HELIG-8-08) TRAINGR	R 1.000E 07 TO	8.000E 08 EV	н	231
HELIOS-A	(HELIO-A-OE). TRAINOR				23,
GALACTIC AND SOLAR COS	MIC RAYS	R 1.000E 07 TO	8.000E 08 EV	H	226
MOTHER MEDITIONS OF COURSE OF	(MOTHER -14) SIMPSON				
	(71-019A-de) MCDONALD	R 1.000E 07 TB	1.000E 08 EV	GН	288
SOLAR AND GALACTIC COS	MIC-RAY STUDIES	R 1.870E 07 TO	8.150E 07 EV	FGH	<b>63</b> ;
HELIDCENTRIC COSMIC-RAY COMPOSITION	(HELOCTR-12) STONE	R 2.000E 07 TO	2.000E 08 EV	н	239
PIONEER 10 COSMIC-RAY SPECTRALIS	(72-012A-12) MCDONALD			.,	
· ·	******************************	K 2.000E 07 TO	2.000E 08 EV	H	96
PIONEER 11 COSMIC-RAY SPECTRALING	(73-019A-12) MCDGNALD				
	*************	R 2-000E 07 TO	2.000E 08 EV	н	136
EXPLORER 47 SOLAR- AND COSMIC-RAY	(72-073A-05) MCDONALD	<b>6</b> 6 665			
	**************************************	R 2.000E 07 TO	8.000E 07 EV		113
•					

PARTICLE RADIATIONS..... R 5.000E 08 TO 5.000E 08 EV

EXPERIMENT ID EXPERIMENTER

DESCRIPTIVE EXPERIMENT TITLE

SATELLITE NAME

R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION

S MAX VALUE (LAMBDA) WIN ABCDEFGHI/012345M PAGE

PLANET

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EXPLORER 43 (71-019A-09) SIMPSON

SATELLITE NAME EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE  2.4 SENSING OTHER PARTICLE SPECIES	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET 5 MAX VALUE (LAMBOA) MIN ABCDEFGHI/012345M PAGE
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	R 5.000E 08 TO 2.000E 09 EV H 63
HELIOCENTRIC (HELOCTR-06) MEYER COSMIC-RAY ELECTRONS AND NUCLEI	R 6.000E 08 TO 6.000E 09 EV H 236
HELIOCENTRIC (HELOCTR-06) MEYER COSMIC-RAY ELECTRONS AND NUCLEI	R 6.000E 09 TO 1.300E 10 EV H 236
HELIDCENTRIC (HELOCTR-06) MEYER CDSMIC-RAY ELECTRONS AND NUCLEI	U 1.300E 10 TO INFINITY H 236

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3. MICROSCOPIC NEUT	RAL MEASUREMENTS			
3.1 SENSING NEUTRON	s			
VELA SA NEUTRON DETECTOR	(69-046D-07) BAME	P ENERGY FLUX	GH	33
VELA 58 NEUTRON DETECTOR	(69-C46E-07) BAME	P ENERGY FLUX	gн	37
VELA 6A NEUTRON DETECTOR	(70-027A-07) BAME	P ENERGY FLUX	GH	50
VELA 68 NEUTRON DETECTOR.	(70-0278-07) BAME	P ENERGY FLUX	GН	53
INDIAN SCIENTIFIC SA SOLAR NEUTRON AND	AT. (INDASAT-02) UNKNOWN GAMMA RAYS	R ENERGY FLUX	0	247

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SATELLITE NAME DESCRIPTIV	EXPERIMENT ID EXPERIMENTER E EXPERIMENT TITLE	R E MEASURED S CHARACTERISTIC	REGION PLANET Abcdefghi/012345M	
3.2 SENSING ATOMS AN	DOR MOLECULES			•
VIKING-A MOLECULAR ANALYSIS	(VIKNG-A-07) BIEMANN	O DENSITY	<b>4</b> .	343
VIKING-8 MOLECULAR ANALYSIS	(VIKNG-8-C7) BIEMANN	D DENSITY'	: • <b>4</b>	350
PIONEER VENUS PROBE 6 Infrared radiometer	(P1078PB-05) SUDMI	U DENSITY.	2	305
PIONEER VENUS PROBE E Gas Chromatograph	(PIO78PB-C4) OYAMA	R ENERGY FLUX	. 2	304
	(72-092A-02) VON ZAHN METER	R ENERGY FLUX	80	121
	(AE-C -07) NIER MASS SPECTROMETER	R ENERGY FLUX	<b>6</b>	150
	(AE-C -C8) PEL2 AL MASS SPECTROMETER	R ENERGY FLUX	В	151
AE-D UPEN SOURCE NEUTRAL	(AE-D -07) NIER MASS SPECTROMETER	R ENERGY FLUX	BC	162
AE-D Closed source Neutr	(AE-D -08) PELZ AL MASS SPECTROMETER	R ENERGY FLUX	вс	163
AE-E OPEŃ SOURCE NEUTRAL	(AE-E -07) NIER MASS SPECTROMETER	R ENERGY FLUX	8	172
AE-E CLOSED SOURCE NEUTR	(AE-E -OB) PELZ AL MASS SPECTROMETER	R ENERGY FLUX	6	173
AE-C ATMOSPHERIC DRAG	(AE-C -02) CHAMFICN	U PARTICLE FLUX		148
AE-C COLD CATHODE ION GAI	(AE-C -15) CARTER	P PARTICLÉ FLUX	B	157
AE-C Capacitance mandmeti	(AE-C ~16) CARTER	P PARTICLE FEUX	В	. 158
AE-D ATMOSPHERIC DRAG	(AE-D ~C2) CHAMPION	U PARTICLE FLUX	В	160
AE-D CAPACITANCE MANOMET	(AE-D ~14) CARTER	P PARTICLÉ FLUX	c	167
E-D COLD CATHODE ION GA	(AE-D -15) CARTER	P PARTI CLE FLUX	c	168
AE-E ATMOSPHERIC DRAG	(AE-E -02) CHAMPION	U' PARTICLE FLUX	<b>a</b> .	169

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3.2 SENSING ATOMS AND/OR MOLECULES				
AE-E (AE-E -12) CARTER CAPACITANCE MANOMETER	P PARTICLE FLUX	В		176
AE-E (AE-E -13) CARTER COLD CATHODE ION GAUGE	P PARTICLE FLUX	В		177
VIKING-A (VIKNG-A-10) HESS METEGROLOGY EXPERIMENT	U PARTICLE FLUX		4	345
VIKING-B (VIKNG-B-05) NIER ATMOSPHERIC STRUCTURE	U PARTICLE FLUX		4	349
VIKING-B (VIKNG-B-10) HESS METEOROLOGY EXPERIMENT	U PARTICLE FLUX		4	352
VIKING-A  (VIKNG-A-05) NIER  ATMOSPHERIC STRUCTURE	U PARTICLE FLUX		4	342
PIONEER VENUS PROCE E (PIO78P8-01) SEIFF ATMOSPHERE STRUCTURE	U PARTICLE FLUX		2	303
VIKING-B (VIKNG-B-05) NIER ATMOSPHERIC STRUCTURE	U PARTICLE FLUX		4	349
SAN MARCO C-2 (SMAR-C2-03) SPENCER NEUTRAL ATMOSPHERE TEMPERATURE	R PRESSURE	В		320
VIKING-A (VIKNG-A-05) NIER ATMUSPHERIC STRUCTURE	U PRESSURE		4	342
AE-C (AE-C -09) SPENCER NEUTRAL GAS TEMPERATURE AND				
AE-D (AE-D -09) SPENCER	R PRESSURE	₿		152
AE-D (AE-D -09) SPENCER NEUTRAL GAS TEMPERATURE AND CONCENT RAT [ON	R PRESSURE	вс		164
AE-E (AE-E -09) SPENCER NEUTRAL GAS TEMPERATURE AND CUNCENTRATION	R PRESSURE	8		174
MARINER 77A (MARN77A-02) ESHLEMAN COHERENT S- AND X-BAND TRANSMITTER AND	D ODECTUDE		5	271
PIONEER VENUS PROBE ( (PIO78PC-01) SEIFF	R PRESSURE		,	2/1
ATMOSPHERE STRUCTURE	U PRESSURE		2	307
PIONEER VENUS PROBE D (PIO78PD-01) SEIFF ATMOSPHERE STRUCTURE	U PRESSURE		2	309

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3.2 SENSING ATOMS AND/OR MOLECULES		
PIONEER VENUS PROBE E (PIO78PE-01) SEIFF ATMOSPHERE STRUCTURE	U PRESSURE	2 311
VIKING-A (VIKNG-A-10) HESS METEOROLUGY EXPERIMENT	U PRESSURE	4 345
VIKING+8 (VIKNG-8-08) NIER ATMOSPHERIC STRUCTURE	U PRESSURE	4 349
VIKING-8 (VIKNG-8-10) HESS METEOROLOGY EXPERIMENT	U PRESSURE	4 352
MARINER 77 E (MARN778-02) ESHLEMAN COHERENT S- AND X-BAND TRANSMITTER AND S-RAND DECEMBED	D. DDECENOS	
PIONEER VENUS PROBE 8 (PIO78PB-01) SEIFF	R PRESSURE	5 277
ATMOS PHERE STRUCTURE	U PRESSURE	2 303
APDLLO 14 LM ALSEP (71-008C-07) JOHNSON COLD CATHODE ION CAUGE EXPERIMENT	U TEMPERATURE	. 4 57
APOLLO 15 LM/ALSEP (71~063C-07) JOHNSON COLD CATHODE ION GAUGE EXPERIMENT	U TEMPERATURE	ч 79
ESRO 4 (72-092A-02) VON ZAHN NEUTRAL MASS SPECTOMETER	R TE MPE RATURE	BC 121
APOLLU 17 LM/ALSEF (72~096C-08) HOFFMAN ATMOSPHERIC COMPOSITION	R TEMPERATURE	M 125
AC-A (AC-A -01) KEATING ATMOSPHERIC DRAG DENSITY	U TEMPERATURE	C 145
AD-A (AC-A -C2) NIER ATMOSPHERIC COMPOSITION MASS		
SPECT ROMET ER	O TEMPERATURE	C 145
AD-B (AD-B -01) KEATING ATMOSPHERIC DRAG DENSITY	U TEMPERATURE	C 146
AD-B (AD-B -02) NIER ATMOSPHERIC CUMPOSITION MASS SPECTROMETER	c Temospatups	C 147
AE-C (AE-C -07) NIER	O TEMPERATORE	247
OPEN SOURCE NEUTRAL MASS SPECTROMETER	R TEMPERATURE	· <b>8</b> 150
AE-C (AE-C -08) PELZ CLOSED SOURCE NEUTRAL MASS SPECTROMETER	R TEMPERATURE	B 151
AE-C (AE-C -09) SPENCER NEUTRAL GAS TEMPERATURE AND		

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3.2 SENSING ATOMS AND/OR MOLECULES			·
CONCENTRATION.	R TEMPERATURE	B	152
AE-D (AE-D +07) NIER OPEN SOURCE NEUTRAL MASS SPECTROMETER	R TEMPERATURE	<b>8</b> C	162
AE-D (AE-D ~08) PELZ CLOSED SOURCE NEUTRAL MASS SPECTROMETER	R TEMPERATURE	вс	163
AE-D (AE-D -CS) SPENCER  NEUTRAL GAS TEMPERATURE AND  CONCENTRATION	R TE MPERATURE	8C	164
AE-E (AE-E -07) NIER	•		
OPEN SOURCE NEUTRAL MASS SPECTROMETER	R TEMPERATURE	В	172
AE-E (AE-E -08) PELZ CLOSED SOURCE NEUTRAL MASS SPECTROMETER	R TE MPERATURE	8	173
AE-E (AE-E -09) SPENCER NEUTRAL GAS TEMPERATURE AND CONCENTRATION	R TEMPERATURE	В	174
AEROS-B (AEROS-B-05) SPENCER  NEUTR AL ATMOSPHERE TEMPERATURE  EXPERIMENT	R TEMPERATURE	8C	179
AEROS-E (AEROS-8-06) ROEMER ATMOSPHERIC DRAG ANALYSIS	U TEMPERATURE	c	180
FIGNEER VENUS PROBE A (PIO78PA-03) VON ZAHN NEUTRAL PARTICLE MASS SPECTROMETER	R TEMPERATURE		2 301
PICNEER VENUS PROBE B (PIG78PB-06) SPENCER NEUTRAL PARTICLE MASS SPECTROMETER	R TEMPERATURE		2 305
SAN MARCO C-2 (SMAR-C2-01) BROGLIO ATMOSPHERIC DRAG CENSITY ACCELEROMETER	U TEMPERATURE	c	319
SAN MARCO C-2 (SMAR-C2-02) NEWTON NEUTRAL ATMOSPHERE COMPOSITION	R TEMPERATURE	8	320
AEROS-B (AEROS-B-01) KRANKOWSKY MASS SPECTROMETER (MS)	R TEMPERATURE	вс	178
ASTP (ASTP -03) DONÁHUE ULTRAVIOLET ATMOSPHERIC ABSORPTION	R TEMPERATURE	B	183
PIONEER VENUS PROBE A (PIO78PA-05) STEWART ULTRAVIOLET SPECTROMETER	R TEMPERATURE		2 302
PIONEER VENUS PROBE B (PIO78PB-01) SEIFF ATMOSPHERE STRUCTURE	U TEMPERATURE		2 303

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3.2 SENSING ATOMS	AND/OR MOLECULES		
VIKING-8	(VIKNG-B-C4) NIER		
ATMOSPHERIC COMPO	S IT ION	R TEMPERATURE	4 349
VIKING-A	(VIKNG-A-C4) NIER		
	SITION	R TEMPERATURE	4 341
MARINER 77A	(MARN77A-11) LILLIE		
MULTIFILTER PHOTO			
2200-7300 A	*************************	D TEMPERATURE	5 275
MARINER 77E	(MARN778-11) LILLIE		
MULTIFILTER PHOTO	POLARIMETER,		
2200-7300 A	• • • • • • • • • • • • • • • • • • • •	O TE MPERATURE	5 281

SATELLITE NAME EXPERIMENT ID EXPERIMENTER  DESCRIPTIVE EXPERIMENT TITLE	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 0 1 2345M	PAGE
&. OBSERVATIONS OF MACROSCOPIC BODIES				
4-1 SENSING MERCURY				
MARINER-J VENUS/MERCURY (MARINJ -02) HOWARD S- AND X-BAND RADIO PROPAGATION	GRAVITY FIELD	ORBIT ANALYSIS	12	267
YARRINER-J VENUS/MERCURY (WARRA) WURRAY PHOTOGRAPHS OF MERCURY AND VENUS	SURFACE CHAR	PHOTO, LOW RES	1	266

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4.2 SENSING VENUS	•		
PIONEER VENUS PROBE E (PIO78PB-01) SEIFF ATMOSPHERE STRUCTURE	ATMOS FEATURE	OTHER TECHNIQUES	2 303
PIONEER VENUS PROBE ( (PIO78PC-01) SEIFF ATMOSPHERE STRUCTURE	ATMOS FEATURE	OTHER TECHNIQUES	2 397
PIONEER VENUS PROBE D (PIO78PD-01) SEIFF ATMOSPHERE STRUCTURE	ATMOS FEATURE	OTHER TECHNIQUES	2 309
FIGNEER VENUS PROBE D (PIO78PD-03) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACK IN G	ATMCS FEATURE	OTHER TECHNIQUES	
FIGNEER VENUS PROBE & (PIG78PE-01) SEIFF	AIMUS FEATURE	OTHER TECHNIQUES	2 310
ATMOSPHERE STRUCTURE	ATMOS FEATURE	OTHER TECHNIQUES	2 311
PIONEER VENUS PROBE & (P1078PE-03) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE			
INTERFEROMETRIC TRACKING	ATMOS FEATURE	OTHER TECHNIQUES	2 312
PIONEER VENUS PROBE A (PIO78PA-06) PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	ATMOS FEATURE	OTHER TECHNIQUES	2 302
PIONEER VENUS PROBE E (PIO78PB-02) BLAMONT CLOUD EXTENT, STRUCTURE, AND			
DISTRIBUTION	ATMOS FEATURE	OTHER TECHNIQUES	2 304
PIONEER VENUS PROBE E (PIO78PB-09) PETTENGILL Differential very-long-baseline			
INTERFEROMETRIC TRACKING	ATMOS FEATURE	OTHER TECHNIQUES	2 306
PIONEER VENUS PROBE C (PIOT8PC-02) BLAMONT CLOUD EXTENT, STRUCTURE, AND			
DISTRIBUTION	ATMOS FEATURE	OTHER TECHNIQUES	2 308
PIONEER VENUS PROBE ( {PIO78PC-03} PETTENGILL DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	ATMOS FEATURE	OTHER TECHNIQUES	2 308
PIONEER VENUS PROBE C (PIO78PD-02) BLAMONT CLOUD EXTENT, STRUCTURE, AND			
DISTRIBUTION	ATMOS FEATURE	OTHER TECHNIQUES	2 310
PIGNEER VENUS PROBE E (PIG78PE-02) BLAMONT CLOUD EXTENT, STRUCTURE AND DISTRIBUTION	ATMOS FEATURE	OTHER TECHNIQUES	2 311
FIGNEER VENUS PROBE 6 (P1078P8-05) SUGMI INFRARED RADIOMETER	ATMOS FEATURE	OTHER TECHNIQUES	2 305
MARINER-J VENUS/MERCURY (MARINJ -02) HOWARD S- AND X-BAND RADIO PROPAGATION	GRAVITY FIELD	ORBIT ANALYSIS	12 267
PI ONEER VENUS PROBE 6 (PIO78PB-03) KNOLLENBERG			•

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4.2 SENSING VENUS			
CLOUD PARTICLE SIZE SPECTROMETER	SIZE	VISUAL OBSERVATION	2 304
MARINER-J VENUS/MERCURY (MARINJ -01) MURRAY PHUTUGRAPHS OF MERCURY AND VENUS	SURFACE CHAR	PHOTO. LOW RES	2 266

SATELLITE NAME EXPERIMENT ID EXPERIMENTER MEA SURED MEASURING PLANET DESCRIPTIVE EXPERIMENT TITLE CHARACTERISTIC TECHNIQUE . 012345M PAGE 4.3 SENSING EARTH NIMBUS-F (NIMBS-F-01) KELLÜGG TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) ..... ATMOS FEATURE OTHER TECHNIQUES 290

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	4.4 SENSING EARTH'S M	IOON				
	4.4.2 NON-GEOGRAPHIC	CHARACTER IST ICS				
	APOLLO 17 LM/ALSEP Lunar Surface Gravim	(72-096C-09) WEBER	GRAVITY FIELD	OTHER TECHNIQUES	M 126	
	APGLLO 15 LM/ALSEP HEAT FLOW	(71-062C-06) LANG SE TH	INTERIGR CHAR	OTHER TECHNIQUES	м 78	
	APOLLO 12 LM/ALSEP PASSIVE SEISMIC	(69-099C-03) LATHAM	INTERIOR CHAR	SEISMIC TECH	м 41	٠.
	APOLLO 14 LM/ALSEP PASSIVE SEISMIC	(71-008C-04) LATHAM	INTERIOR CHAR	SEISMIC TECH	м 56	
	AFOLLO 14 LM/ALSEP ACTIVE SEISMIC	(71-008C-05) KÜVACH	INTERIOR CHAR	SEISMIC TECH	M 56	
	APOLLO 15 LM/ALSEP PASSIVE SEISMIC	(71-063C-01) LATHAM	INTERIOR CHAR	SEISMIC TECH	м 7.7	•
	APOLLO 16 LM/ALSEP PASSIVE SEISMIC	(72-031C-01) LATHAM	INTERIOR CHAR	SEISMIC TECH	M 101	
(B	APOLLO 16 LM/ALSEP ACTIVE SEISMIC	(72-031C-02) KOVACH	INTERIOR CHAR	SEISNIC TECH	м 102	
592	APOLLO 17 LM/ALSEP LUNAR SEISMIC PROFIL	(72-096C-06) KOVACH Ling Experiment	INTERIOR CHAR	SEISMIC TECH	M 125	
	APOLLO 15 LM/ALSEP PASSIVE SEISMIC	(71-063C-01) LATHAM	INTER IOR CHAR	SEISMIC TECH	м 77	
	APOLLO 16 LM/ALSEP PASSIVE SEISMIC	(72-031C-01) LATHAM	INTERIOR CHAR	SEISMIC TECH	M 101	
	AFOLLÜ 16 LM/ALSEP ACTIVE SEISMIC	(72-031C-02) KOVACH	INTERIOR CHAR	SEISMIC TECH	м 102	
	APOLLO 17 LM/ALSEP Lunar ejecta and met	(72-096C-05) BERG TEORITES	PARTICLE FLUX	OTHER TECHNIQUES	м 124	
	APOLLO 17 LM/ALSEP HEAT FLOW	(72-096C-01) LANG SE TH	TEMPERATURE	OTHER 1 ECHNIQUES	M 124	
	APOLLC 15 LM/ALSEP HEAT FLOW	(71-063C-06) LANGSETH	TEMPERATURE	OTHER TECHNIQUES	M 78	
	APOLLO 17 LM/ALSEP HEAT FLOW************************************	(72-096C-01) LANGSETH	TEMPERATURE	OTHER TECHNIQUES	; м 124	
	APCLLO 15 LM/ALSEP	(71-062C-06) LANG SE TH	TEMPERATURE	OT HER TECHNIQUES	₩ <b>7</b> 8	

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	SATELLITE NAME . EXPERIMENT ID EXPERIMENTER DESCRIPTIVE EXPERIMENT TITLE	MEASURED CHARACTERISTIC	MEASURING TE CHNIQUE	PLANET 012345M PAGE	•
	4.5 SENSING MARS				
	VIKING-A (VIKNG-A-05) NIER ATMOSPHERIC STRUCTURE	ATMOS FEATURE	OTHER TECHNIQUES	<b>4</b> 342	
	VIKING-A (VIKNG-A-14) MICHAEL, JR. RADIO COMMUNICATION AND RADAR LANDING				
	SYSTEMS PLUS X BAND	GRAVITY FIELD	ORBIT ANALYSIS	4 3,46	
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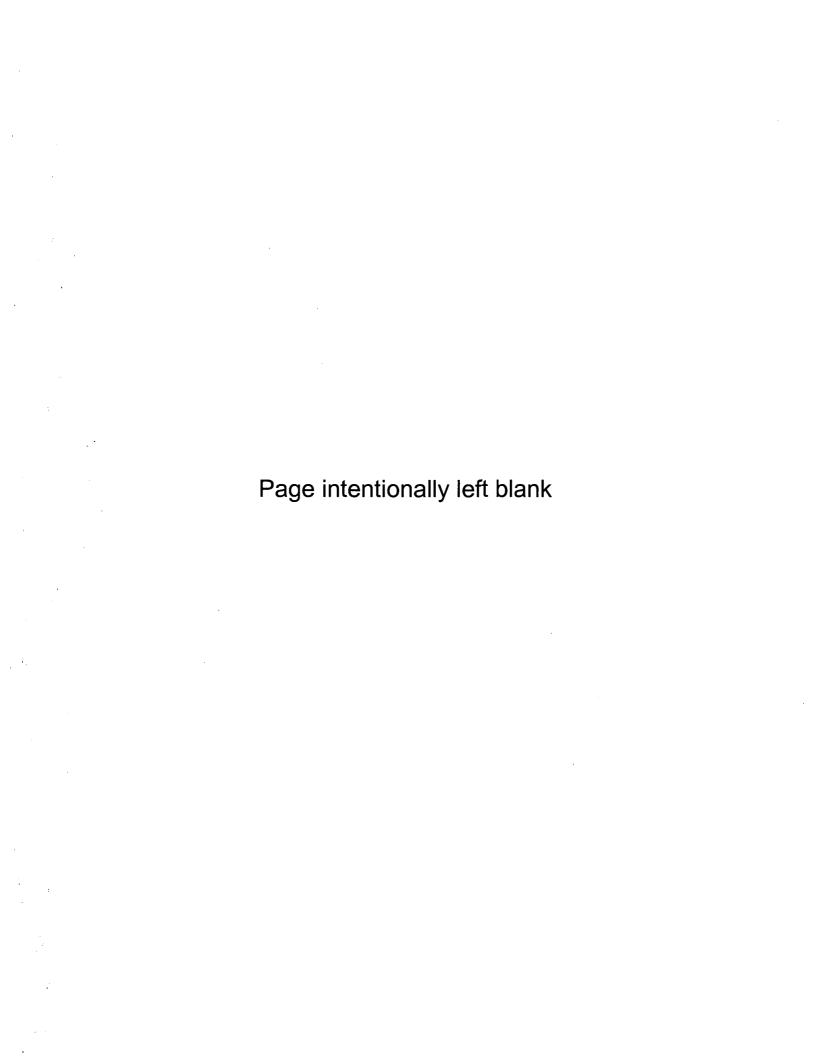
### Spacecraft Launched

The following table of spacecraft successfully launched between October 1, 1972, and September 30, 1973, consists of active spacecraft from Section 1 of this Report, as well as other spacecraft for which little is known beyond the fact that they have been launched with the indicated initial orbit parameters. This second group is included here to make the spacecraft visible to the scientific community on the chance that these spacecraft contain experiments which may be relevant to studies performed by the users of this document. Some information concerning these lesser known spacecraft is available through the SPACEWARN Bulletin (described in the Introduction to this Report).

The table is ordered chronologically by NSSDC ID Code (corresponding to spacecraft launch date). The spacecraft common name appears alongside its NSSDC ID Code. The spacecraft funding country, the launch date, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, period, and inclination), rounded off to one decimal place, are also included for each spacecraft entry listed in the table.

Note that alternate names for spacecraft are cross-indexed in the Spacecraft Name Index.

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#### SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30. 1973

SPACECRAFT NAME	NSSDC II	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	E ORBIT TYPE	APOAPSIS	PER I APSIS	INCLINATION	PERIOD
STP 72-1	72-076A	UNITED STATES	10/02/72						
1972-076B	* 72-076B	UNITED STATES	10/02/72	10/05/72	GEOCENT RIC	753.0	732.0	98.4	99.7
COSMOS 522	72-077A	U.S.S.R.	10/04/72	10/05/72	GEOCENTRIC	342.0	214.0	72.9	89.8
COSMOS 523	72-078A	U.S.S.R.	10/05/72	10/06/72	GEOCENTRIC	307.0	283.0	71.0	92.0
1972-079A	72-079A	UNITED STATES	10/10/72	10/10/72	GEOCENTRIC	271.0	158.0	96.5	66.8
COSMOS 524	72-080A	U.S.S.R.	10/14/72	10/12/72	GEOCENTRIC	537.0	277.0	71 • 0	92.3
MOLNIYA 1W	72-081A	U.S.S.R.	10/14/72	10/15/72	GED CENT RIC	39300.0	480.0	65.3	705.0
NGAA 2	72-082A	UNITED STATES	10/15/72	09/07/73	GEOCENTRIC	1453.7	1448.4	1 01 • 7	114.9
OSCAR 6	72-0828	UNITED STATES	10/15/72	10/15/72	GEOCENTRIC	1452.0	1443.0	101.7	114.9
COSMOS 525	72-083A	U.S.S.R.	10/18/72	10/19/72	GEOCENTRIC	292.0	208.0	65-4	89.3
COSMOS 526	72-084 A	U.S.S.R.	10/25/72	10/26/72	GEDCENTRIC	511.0	282.0	71.0	92.0
METEOR 13	72-085A	U+5.5.R.	10/27/72	10/28/72	GEOCENTRIC	904.0	893.0	81.2	102.6
COSMOS 527	72-086A	U.S.S.R.	10/31/72	11/01/72	GEOCENT R IC	330.0	214.0	, 65.4	.89.7
COSMOS 528	72-087A	U.S.S.R.	11/01/72	.11/02/72	GEOCENT RIC	1495.0	1375-0	74 - 0	114.0
C CSMOS 529	72-0878	U+S+S+R+	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 530	72-087C	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 531	72-0870	U+S+S+R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
Ç <i>0</i> 5 MD5 532	72-087E	U-S-5-R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 533	72-087F	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
C 05 MOS 534	72-0876	U .S . S . R .	11/01/72	11/02/72	GEOCENT RIC	1495.0	1375.0	74.0	114.0
COSMOS 535	72-08 <b>7</b> H	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	, 74 - 0	114.0
COSMOS 536	72-088A	U.S.S.R.	11/03/72	11/04/72	GEOCENTRIC	555.0	514.0	74 • 0	95.2
USAF OPERATIONAL METSAT	72-089A	UNITED STATES	11/09/72	11/09/72	GEOCENTRIC	877.0	796.0	98.6	101.7
ANIK 1	72-090A	CANADA	11/10/72	11/10/72	GEOCENTRIC	1680.2	204.8	63.9	103.9
EXPLORER 48	72-091 A	UNITED STATES	11/15/72	11/16/72	GEOÇENT RIC	630.7	445.5	1.9	95+4
.ESRO .4	72-092A	INTERNATIONAL	11/22/72	09/07/73	GEOCENTRIC	833.7	230.8	91,-1	95.3
COSMOS 537	72-093A	U#S#S*R#	11/25/72	11/26/72	GEOCENTRIC	324.0	207.0	65.0	89.6
INTERCOSMOS 8	72-094A	U.S.5.R.	11/30/72	12/01/73	GEOCENTRIC	679.0	214.0	71.0	93.2
	4		and the production of						

## SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

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SPACECRAFT NAME	NSSOC 10	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
1973-014A	73-014A	UNITED STATES	03/09/73	03/10/73	GEOCENTRIC	270.0	152.0	95.7	64.5
METEOR 14	73-015A	U-S.S.R.	03/20/73	03/21/73	GEDCENT RIC	903.0	882.0	81.2	102.6
COSMOS 552	73-016A	U.S.S.R.	03/22/73	03/23/73	GEOCENTRIC	312.0	204.0	72.8	69.7
SALUTE 2	73-017A	U.S.S.R.	04/04/73	04/04/73	GEOCENTRIC	260.0	215.0	51 - 6	59.0
MOLNIYA 2E	73-018A	U.S.S.R.	04/05/73	04/06/73	GEOCENT RIC	39100.0	500.0	65.0	11.4
PIONEER 11	7 3-0 19 A	UNITED STATES	04/06/73		JURITER FLYBY				
COSMOS 553	73-020A	U.S.S.R.	04/12/73	04/13/73	GEOCENTRIC	.519.0	282.0	71.0	92.2
COSMOS 554	73-021A	U.S.S.R.	04/19/73	04/20/73	GEOCENTRIC	308.0	212.0	72.9	89.5
INTERCOSM COPERNICUS 500	73-022A	U.S.S.R.	04/19/73	04/20/73	GEDCENTRIC	1552.0	202.0		
ANIK 2	73-023A	CANA DA	04/19/73	05/01/73	-			48 • 5	102.2
COSMOS 555	73-024A		04/25/73			35788.0	35761.0	. 0.1	1436.0
COSMOS 556	73-025A				GEOCENTRIC	253.0	216.0	-61.3	89.0
COSMOS 557	73-026A		05/05/73	05/06/73	GEOCENTRIC	252.0	209.0	81.3	<b>59.</b> 0
SKYLAB			05/11/73	05/12/73	GEOCENTRIC .	266.0	218.0	51 - 6	89.1
•		UNITED STATES	05/14/73	05/14/73	GEOCENTRIC	442.0	434.0	50.0	93.4
1973-028A		UNITED STATES	05/16/73	05/17/73	GEOCENT RIC	399.0	139.0	110.5	89.9
COSMOS 558	7 3-0 29 A	U.S.S.R.	05/17/73	05/17/73	GEOCENTRIC	501.0	269.0	71.0	92-3
COSMOS 559	A0E9-E7	U.S. 5.R.	05/18/73	05/19/73	GEOCENTRIC	345+0	217.0	65.4	89.8
COSMOS 560	73-031A	U-S-S-R-	05/23/73	05/24/73	GEOCENTRIC	336. 0	211.0	72.9	89.7
SKYLAB CSM-1	73-032A	UNITED STATES	05/25/73	05/25/73	GEOCENTRIC	438.0	428.0	50.0	93.2
COSMOS S61	73-033A	U.S.S.R.	05/25/73	05/26/73	GEOCENTRIC	317.0	215.0	65.4	89.5
HETEOR 15	A4E 0-E7	U .S .S .R.	05/29/73	05/30/73	GEOCENT RIC	909.0	867. 0	81.2	102.5
COSMOS 562	73-035A	U-S-S-R.	06/05/73	06/06/73	GEOCENTRIC	510-0	282.0	71.0	92.1
COSMOS 563	73-036A	U.S.S.R.	06/06/73	05/07/73	GEOCENTRIC	320.0	312.0	65.4	89.5
COSMOS 564	73-037.A	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	. 74.0	114-5
COSMOS 565	73-0378	U.S.S.R.	06/08/73	06/09/73	GEOCENT RIC	1507.0	1392.0	74.0	114.5
C CSMOS 566	73-037C	U .S .S .R.	06/08/73	,	GEDCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 567	73-037D	U.S.S.R.	06/08/73	•	GEOCENTRIC	1507.0	1392.0	74.0	
COSMOS 568	73-037E	U.S.S.R.	06/08/73	06/09/73	•				114-5
						1507. 0	1 392. 0	74.0	114.5

	•									
COSMOS 569	73-037F	U +S +S +R +	06/08/73	06/09/73	GEOCENTREC	1507.0	1392.0	74.0	114.5	
COSMOS 570	73-037G	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5	
COSMOS 571	73-037H	U.S.S.R.	06/08/73	05/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5	
COSMUS 57 2	73-038A	U.S.S.R.	06/10/73	06/11/73	GEDCENTRIC	294.0	211.0	51.7	8 <b>9</b> . 3	
EXPLORER 49	73-039A	UNITED STATES	06/10/73	09/07/73	GEOCENTRIC	1070.3	1059-1	36.7	221 • 9	
1973-040A	73-040A	UNITED STATES	06/12/73	07/01/73	GEOCENT RIC	35901.0	35533.0	0.5	1431.9	
COSMOS 573	73-041A	U.S.S.R.	06/15/73	06/16/73	GEOCENTRIC	329.2	196.2	51.6	89.5	
COSMOS 574	73-042A	U.S.S.R.	06/20/73	06/21/73	GEOCENT R I C	1 026.0	996.0	83.0	1 05.0	
COSMOS 575	73-043A	U.S.S.R.	06/21/73	06/22/73	GEDCENTRIC	299+0	208-0	65-4	89.3	
COSMOS 576	73-044A	U .S .S.R.	06/27/73	06/28/73	GEOCENT RIC	366.0	21 2.0	72.9	89.9	
MOLNIYA 2F	73-045A	U.S.S.R.	07/11/73	07/12/73	GEOCENTRIC	39 280 +0	480.0	65 <b>. 3</b>	705. ©	
1973-046A	73-046A	UNITED STATES	07/13/73	07/15/73	GEOCENTRIC	269.0	156.0	96.2	<b>8</b> 6 - 8	
MARS 4	73-047A	U.S.SoRo	07/21/73							
COSMOS 577	73-048A	U-S-S-R+	07/25/73	07/26/73	GEOCENTRIC	312-0	209.0	65.4	89.S	
MARS 5	73-049A	U .S .S .R.	07/25/73							
SKYLAB CSM-2	73-050A	UNITED STATES	07/28/73	07/28/73	GEOCENTRIC	441.0	423.0	50 <sub>+</sub> 0	93.2	
COSMOS 578	73-051A	U.S.S.R.	08/01/73	08/02/73	GEDCENTRIC	308.0	207.0	65.4	89.4	
MARS 6	73-052A	U.S.S.R.	08/05/73							
MARS 7	73-053A	U.S.S.R.	08/09/73							
1973-054A	73-054A	UNITED STATES	08/17/73							
COSMOS 579	73-055A	U-S-5-R-	06/21/73	08/22/73	GEOCENT RIC	315.0	209.0	65.4	80.5	
1973-056A	73-056A	UNITED STATES	08/21/73							
CUSMOS 580	73-057A	U.S.S.R.	08/22/73	08/23/73	GEOCENTRIC	518.0	283.0	71.0	92.42	
INTELSAT 4 F-7	73-05.8A	UNITED STATES	08/23/73							
COSMOS 581	73-059A	U.S.S.R.	Q8/24/73	08/25/73	GEOCENTRIC	0.EDE	211.0	61.4	69.4	
COSMOS 582	73-060A	Ua5aSeRe	08/28/73	08/29/73	GEOCENTRIC	559+0	521.0	74.0	95.3	
MOLNIYA 1Z	73-061 A	U.S.S.R.	08/30/73	08/31/73	GEOCENTRIC	37970.0	480.0	66.3	619.0	

# SPACECRAFT LAUNCHED BETWEEN OCTOBER 1. 1972 AND SEPTEMBER 30. 1973

SPACECRAFT NAME	NSSDC ID FUNDING COUNTRY	LAUNCH DATE EPOC	H DATE ORBIT TYPE	APDAPSIS	PERIAPSIS	INCLINATION	PERIOD
COSMO\$ 583	73-062A U.S.S.R.	08/30/73 08/	31/73 GEOCENTRIC	31 <b>6.</b> 0		65.0	89.5
COSMOS 584	73-063A U.S.S.R.	09/06/73 09/	07/73 GEOCENTRIC	360.0	213.0	72.9	89.9
COSMOS 585	73-064A U.S.S.R.	08/08/73 09/	9/73 GEOCENTRIC	1416.0	1385.0	74.0	
COSMOS 586	73-065A U.S.S.R.	09/14/73 09/	15/73 GEDCENTRIC	1020.0	986.0		113.6
COSMOS 587	73-066A U.S.S.R.	09/21/73 09/	22/73 GEOCENTRIC			63.0	1 95.0
SOYUZ 12	73-067A U.S.S.R.		28/73 GEOCENTRIC	330.0	215.0	65.4	89.6
1973-068A	73-068A UNITED STATES	09/27/73	LOVIS GEOCENIKIC	249 =0	194.0	51.6	86.6

# Spacecraft and Experiments Which Became Operational Off

The following table identifies spacecraft and/or experiments placed in an operational off status between October 1, 1972, and September 30, 1973. The table is ordered alphabetically by spacecraft common name. For each spacecraft listed, the following information appears: the NSSDC ID Code, the spacecraft funding country, the launch date, the date the spacecraft was placed in an operational off mode, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period) rounded off to one decimal place. This additional information is included on the same line as the spacecraft common name.

Associated operational off experiments are listed for each space-craft entry. The experiment NSSDC ID Code, the principal investigator's last name, the affiliation, the experiment name, and the date the experiment was placed in an operational off mode are given for each experiment. To determine when an experiment has been placed in an operational off mode and the spacecraft has not, observe (in the table) the column in which the spacecraft operational off date should appear; that column will be blank.

Note that alternate names for spacecraft are cross-indexed in the Spacecraft Name Index.



### SPACECRAFT AND EXPERIMENTS WHICH BECAME OPERATIONAL OFF BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

*	,						
* *SPACECRAFT NAME *	NSSOC ID	FUNDING COUNTRY	LAUNCH DATE S/C EPOCH ORBIT TYPE DATE PLACED DATE	APO- APS IS	PERI- IN APSIS N	CLI- ATION PE	ERIOD
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•	*			DATE EX	* * * *	* * * * *	* * *
	* * * * * * * * * * * * * * * * * * *	EXPER IMENTER	EXPERIMENT NAME	PLACED			
	*		. <del>-</del>	OP OFF			
		•		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	•		
ALOUETTE 2	65-09 8A	CANA DA	11 100 105				
	05-07 CA	UNITED STATES	11/29/65 / / 01/24/72 GEOCENTRIC	2935.0	510-0	79.8	120.9
	6E-098A-01		SWEEP FREQUENCY SOUNDER				
	65-098A-02		VLF RECEIVER	06/03/73			
	65-098A-03		COSMIC RADIO NOISE	06/03/73			
	55-098A-04			06/03/73			
	65-098A-05		ENERGETIC PARTICLES DETECTORS	06/03/73			
18			CYLINDRICAL ELECTROSTATIC PROBE	06/03/73			
ATS 5	69-06 SA	UNITED STATES	08/12/69 / / 08/23/69 GEOCENTRIC	36894.0	35760.0	2.6	1463.0
	69-069A-02		COSMIC RADIO NOISE, SOLAR RADIO BURSTS	06/01/73			
	69-0694-05		PROTON ELECTRON DETECTOR	01/01/73			
	69-069A-06	IPPOLITO	MILLIMETER WAVE PROPAGATION EXPERIMENT	01/01/73			
EOLE	71-071A	FRANCE	08/16/71 / / 06/24/72 GEOCENTRIC	904.0	676.4	50.2	100.7
•		UNITED STATES	,				2004.
	71-071A-01	BANDEEN	UPPER ATMOSPHERE WINDS AND WEATHER DATA RELAY SYSTEM	12/31/72		•	
ESSA 9	69-016A	UNITED STATES	02/04/40 11/04/70 14/11/11	. • •			
		NESS STAFF	02/26/69 11/24/72 02/26/69 GEOCENTRIC	1504.0	1423-0	101.8	<b>815.2</b>
•	09 01 5M - 01	NESS SIMPP	ADVANCED VIDICON CAMERA SYSTEM (AVCS)	11/24/72			
EXPLORER 38	68-055A	UNITED STATES	07/04/68 / / 07/06/68 GEOCENTRIC	5040 0			
•	68-055A-01	STONE	STEP FREQUENCY RADIGMETERS	5862.0	642.0	120.6	156.7
	58-055A-02	STONE	RADI C BURSTS RECEIVERS	12/31/72			
	68-055A-03	STONE	CAPACITANCE PROBE	12/31/72			
	68-055A-04	STONE	IMPEDANCE PROBE	12/31/72	t.		
	68-055A-05	STONE	PLANAR ELECTRON TRAP	12/31/72 12/31/72			
NIMBUS 4	70-025A	UNITED STATES	06.400.470				
	70-025A-04		04/08/70 / / 09/07/73 GEOCENTRIC	1099-3	1087.5	99.8	107-1
		Westers	SATELLITE INFRARED SPECTROMETER (SIRS)	03/06/73			
050 5	69-00 6A	UNITED STATES	01/22/69 / / 01/22/69 GEOCENTRIC				
	69-006A-01	BO YO	X RAY SPECTROHELIDGRAPH	570.0	532+0	33.0	95.8
	69-006A-02	PURCELL	EXTREME UV SPECTROHELIOGRAPH	12/31/72			
	69-00 6A-05	FROST	LOW ENERGY GAMMA RAY EXPERIMENT	12/31/72 12/31/72			
	69-006A-06	6L AMONT	MEASUREMENT OF THE SELF REVERSAL OF THE	12/31/72			
			SCLAR LYMAN ALPHA LINE	+2/31/12			
	69-006A-07	NEY	ZODIACAL LIGHT MONITOR	12/31/72			
PIONEER 11	73-019A	UNITED STATES	04/06/73 / JUPITER FLY				
	73-019A-08		INFRARED RADIGMETER	04/06/73			
SKYLAB	73_074		** ** ***				
417 1 4 A		UNITED STATES	05/14/73 / / 05/14/73 GEOCENTRIC	442.0	434.0	50.0	93.4
	73-027A-01		NUCLEAR EMULSION	09/25/73			
	73-027A-02	MENIZE	ULTRAVIOLET STELLAR ASTRONOMY	09/25/73			

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* EXPERIMENTER EXPERIMENT NAME PLACED *  * DP OFF *  73-027A-03 TOUSEY UV/X-RAY SCLAR PHOTOGRAPHY 09/25/73  73-027A-06 MILLIGAN DUAL X-RAY TELESCOPE 09/25/73  73-027A-07 MILLIGAN DUAL X-RAY TELESCOPE 09/25/73  73-027A-09 WEINBERG GEGENSCHEIN/ZODIACAL LIGHT 09/25/73  73-027A-10 TOUSEY UV CORONAL SPECTROHELIOGRAPH 09/25/73  73-027A-11 TOUSEY EUV SPECTROGRAPH 09/25/73  73-027A-12 HEMENWAY PARTICLE COLLECTION 09/25/73  73-027A-14 CDURTES ULTRAVIOLET PANDRAMA 09/25/73  73-027A-15 REEVES HYDROGEN ALPHA TELESCOPE NUMBER 1 09/25/73  73-027A-16 UNKNOWN HYDROGEN ALPHA TELESCOPE NUMBER 2 09/25/73  73-027A-17 DEMEL MULTISPECTRAL PHOTOGRAPHY FACILITY 09/25/73  73-027A-18 BARNETT INFRARED SPECTROHETER 09/25/73  73-027A-19 KORB MULTISPECTRAL PHOTOGRAPHY FACILITY 09/25/73  73-027A-20 EVANS L-BAND MICROWAVE RADIOMETER 09/25/73	
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73-027A-03 TOUSEY UV/X-RAY SCLAR PHOTOGRAPHY 09/25/73 73-027A-07 MILLIGAN DUAL X-RAY TELESCOPE 09/25/73 73-027A-08 PACKER UV AIRGLCW HORIZON PHOTOGRAPHY 09/25/73 73-027A-09 WEINBERG GEGENSCHEIN/ZODIACAL LIGHT 09/25/73 73-027A-10 TOUSEY UV CORONAL SPECTROHELIOGRAPH 09/25/73 73-027A-11 TOUSEY EUV SPECTROGRAPH 09/25/73 73-027A-12 HEMENWAY PARTICLE COLLECTION 09/25/73 73-027A-14 COURTES ULTRAVIOLET PANORAMA 09/25/73 73-027A-15 REEVES HYDROGEN ALPHA TELESCOPE NUMBER 1 09/25/73 73-027A-16 UNKNOWN HYDROGEN ALPHA TELESCOPE NUMBER 2 09/25/73 73-027A-17 DEMEL HYDROGEN ALPHA TELESCOPE NUMBER 2 09/25/73 73-027A-18 BARNETT INFRARED SPECTROMETER 09/25/73 73-027A-19 KORB MULTISPECTRAL PHOTOGRAPHY FACILITY 09/25/73 73-027A-20 EVANS L-BAND MICROWAVE RADIOMETER 09/25/73	
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73-027A-07 MILLIGAN  73-027A-08 PACKER  73-027A-09 WEINBERG  73-027A-10 TOUSEY  73-027A-11 TOUSEY  73-027A-12 HEMENWAY  73-027A-14 CDURTES  73-027A-15 REEVES  73-027A-16 UNKNOWN  73-027A-16 UNKNOWN  73-027A-17 DEMEL  73-027A-18 BARNETT  73-027A-18 KORB  73-027A-20 EVANS  MICROWAVE RADIOMETER  MICROWAVE RADIOMETER  POWS PRICEDER  O9/25/73	
73-027A-08 PACKER UV AIRGLCW HORIZON PHOTOGRAPHY 09/25/73 73-027A-09 WEINBERG GEGENSCHEIN/ZODIACAL LIGHT 09/25/73 73-027A-10 TOUSEY UV CORONAL SPECTROHELIOGRAPH 09/25/73 73-027A-11 TOUSEY EUV SPECTROGRAPH 09/25/73 73-027A-12 HEMENWAY PARTICLE COLLECTION 09/25/73 73-027A-14 CDURTES ULTRAVIOLET PANDRAMA 09/25/73 73-027A-15 REEVES HYDROGEN ALPHA TELESCOPE NUMBER 1 09/25/73 73-027A-16 UNKNOWN HYDROGEN ALPHA TELESCOPE NUMBER 2 09/25/73 73-027A-17 DEMEL MULTISPECTRAL PHOTOGRAPHY FACILITY 09/25/73 73-027A-18 BARNETT INFRARED SPECTROMETER 09/25/73 73-027A-19 KORB MULTISPECTRAL SCANNER 09/25/73 73-027A-20 EVANS MICROWAVE RADIOMETER 09/25/73 ALTIMETER 09/25/73	
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73-027A-20 EVANS MICROWAVE RADIOMETER/SCATTEROMETER/ 09/25/73 ALTIMETER 73-027A-21 EVANS L-BAND MICROWAVE RADIOMETER 09/25/73	
ALTIMETER  73-027A-21 EVANS L-BAND MICROWAVE RADIOMETER 09/25/73	
73-02/A-21 CYARS L-DRIVE COM A COMMON A	
73-0274-22 FORRES EXPANDABLE AIRLOCK MECHANISM 09/25/73	
73-0274-23 LEHN THERMAL COATINGS 09/25/73	
73-027A-24 WHEDON MINERAL BALANCE 09/25/73	
73-027A-25 LEACH BIC-ASSAY OF BODY FLUIDS 09/25/73	
73-027A-26 DRD SPECIMEN MASS MEASUREMENT 09/25/73	
73-027A-27 ALLEBACH VECTOR CARDIDGRAM 09/25/73	
73-027A-28 GRAYBIEL HUMAN VESTIBULAR FUNCTION 09/25/73	
73-027A-29 FROST SLEEP MONITOR 09/25/73	
73-027A-30 KUBIS TIME AND MOTION STUDY 09/25/73	
73-0274-31 MICHEL METABOLIC ACTIVITY 09/25/73	
73-0274-32 THORNTON BODY MASS MEASUREMENT 09/25/73	
73-0274-33 MC KANNAN THERMAL CONTROL COATINGS 09/25/73	
73-0274-34 KIMZEY ZERD GRAVITY FLAMMABILITY 09/25/73	
73-0274-35 JOHNSON, JR. HABITABILITY/CREW QUARTERS 09/25/73	
73-027A-36 RENDALL GRAVITY WORKBENCH 09/25/73	
73-057-057 EVALVA HARDMARE EVALUATION 09/25/73	
73-027A-38 WHITSETT, JR. ASTRONAUT MANEUVERING EQUIPMENT 09/25/73	
73-027A-39 POORMAN MATERIALS PROCESSING FACILITY 09/25/73	
E XPER I NE NTS	
73-0274-40 RANDLE MANUAL NAVIGATION SIGHTINGS 09/25/73	
73-027A-41 LEAVITT IN-FLIGHT EXPERIMENT AEROSOL ANALYSIS 09/25/73	
73-0274-42 CONWAY CREW/VEHICLE DISTURBANCES 09/28/73	
73-027A-43 GOULD PRECISION OPTICAL TRACKING 09/25/73	
73-027A-44 HEWES FOOT-CONTROLLED MANEUVERING UNIT 09/25/73	
73-027A-45 GREENBERG CORONOGRAPH CONTAMINATION MEASUREMENTS 09/25/73	
73-027A-46 MUSCARI CONTAMINATION MEASUREMENTS 09/25/73	
73-027A-47 EDWARDS PILOT DESCRIPTION 09/25/73	
73-027A-48 PRICE TRANSURANIC COSMIC RAYS 09/25/73	
73-027A-49 GEISS FOIL HEAVY NUCLEI ABUNDANCE EXPERIMENT 09/25/73	
73-027A-50 VOGEL BONE NINERAL MEASUREMENT 09/25/73	

# SPACECRAFT AND EXPERIMENTS WHICH BECAME OPERATIONAL OFF BETWEEN OCTOBER 1. 1972, AND SEPTEMBER 30, 1973

LAUNCH DATE S/C EPOCH ORBIT TYPE APO- PERI-INCLI- APSIS APSIS NATION PERIOD  **  **  **  **  **  **  **  **  **
OP OFF  **********************************
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# EXPERIMENTER EXPERIMENT NAME PLACED # OP OFF #  73-027A-51 JOHNSON LOWER BODY NEGATIVE PRESSURE 09/25/73 73-027A-52 LOCKHART CYTOGENETIC STUDIES OF THE BLOOD 09/25/73 73-027A-53 RITZMANN MAN*S IMMUNITY - IN VITRO ASPECTS 09/25/73 73-027A-54 JOHNSON BLOOD VOLUME AND RED CELL LIFE SPAN 09/25/73 73-027A-55 MENGEL RED BLOOD CELL METABOLISM 09/25/73 73-027A-56 KIMZEY SPECIAL HE MATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER MULTIPURPOSE BLECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
# EXPERIMENTER EXPERIMENT NAME PLACED # OP OFF #  73-027A-51 JOHNSON LOWER BODY NEGATIVE PRESSURE 09/25/73 73-027A-52 LOCKHART CYTOGENETIC STUDIES OF THE BLOOD 09/25/73 73-027A-53 RITZMANN MAN*S IMMUNITY - IN VITRO ASPECTS 09/25/73 73-027A-54 JOHNSON BLOOD VOLUME AND RED CELL LIFE SPAN 09/25/73 73-027A-55 MENGEL RED BLOOD CELL METABOLISM 09/25/73 73-027A-56 KIMZEY SPECIAL HE MATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER MULTIPURPOSE BLECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
73-027A-51 JOHNSON LOWER BODY NEGATIVE PRESSURE 09/25/73 73-027A-52 LOCKHART CYTOGENETIC STUDIES OF THE BLOOD 09/25/73 73-027A-53 RITZMANN MAN*S IMMUNITY - IN VITRO ASPECTS 09/25/73 73-027A-54 JOHNSON BLOOD VOLUME AND RED CELL LIFE SPAN 09/25/73 73-027A-55 MENGEL RED BLOOD CELL METABOLISM 09/25/73 73-027A-56 KIMZEY SPECIAL HE MATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER MULTI PURPOSE ELECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMO SPHERIC HEAT ABS ORPTI ON 09/25/73
73-027A-52 LOCKHART CYTOGENETIC STUDIES OF THE BLOOD 09/25/73 73-027A-53 RITZMANN MAN*S IMMUNITY - IN VITRO ASPECTS 09/25/73 73-027A-54 JOHNSON BLOOD VOLUME AND RED CELL LIFE SPAN 09/25/73 73-027A-55 MENGEL RED BLOOD CELL METABOLISM 09/25/73 73-027A-56 KIMZEY SPECIAL HE MATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER WULTI PURPOSE ELECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
73-027A-52 LOCKHART CYTOGENETIC STUDIES OF THE BLOOD 09/25/73 73-027A-53 RITZMANN MAN'S IMMUNITY - IN VITRO ASPECTS 09/25/73 73-027A-54 JOHNSON BLOOD VOLUME AND RED CELL LIFE SPAN 09/25/73 73-027A-55 MENGEL RED BLOOD CELL METABOLISM 09/25/73 73-027A-56 KIMZEY SPECIAL HE MATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER MULTIPURPOSE BLECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
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73-027A-55 MENGEL RED BLODD CELL METABOLISM 09/25/73 73-027A-56 KIMZEY SPECIAL HEMATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER WULTIPURPOSE BLECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
73-027A-56 KIMZEY SPECIAL HEMATOLOGIC EFFECT 09/25/73 73-027A-57 WIEDEMEIER MULTIPURPOSE BLECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
73-027A-57 WIEDEMEIER MULTIPURPOSE ELECTRIC FURNACE 09/25/73 73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
73-027A-58 BOND CREW ACTIVITIES/MAINTENANCE 09/25/73 73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
73-027A-59 ZMOLEK ATMOSPHERIC HEAT ABSORPTION 09/25/73
74 15 15 15 15 15 15 15 15 15 15 15 15 15
73_078_61 H0001010
77-0771-62 00000 50
73_034_43
77-0074 44 PETUS
73-074-55 1545444
77-0274 66 CMANIMON
73-0274-67 FTAEU F
73-0074 60 4650755
73-0274-60 MCMCON MOTOR OTHER DESCRIPTION
77-074-70 MILEO
77-6274 71
72-0274-72 OFF 77
73-0-73-10-10-10-10-10-10-10-10-10-10-10-10-10-
73-037A-7A CONVENCE
73-027A-74 CONVERSE MASS MEASUREMENT 09/25/73 73-027A-75 QUIST NEUTRON ANALYSIS 09/25/73
73-027A-76 DUNLAP LIQUID MOTION IN ZERO GRAVITY 09/25/73

## Spacecraft and Experiments Which Became Inoperable

The following table identifies spacecraft and/or experiments that became inoperable during the time interval October 1, 1972, through September 30, 1973. The table is ordered alphabetically by spacecraft common name. For each spacecraft listed, the following information appears: the NSSDC ID Code, the spacecraft funding country, the launch date, the date the spacecraft became inoperable, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period). This additional information is included on the same line as the spacecraft common name.

For each spacecraft common name entry is listed its associated experiments that have become inoperable. The experiment NSSDC ID Code, the principal investigator's last name, the affiliation, the experiment name, and the date the experiment became inoperable are given for each experiment. To determine when an experiment has become inoperable and the spacecraft has not become inoperable, observe (in the table) the column in which the spacecraft inoperable date should appear; that column will be blank.

In cases where a prelaunch ID appears where one would expect to find an NSSDC postlaunch ID, the particular spacecraft failed to launch or failed to orbit, and was therefore not assigned an international designation.

Note that alternate names for spacecraft are cross-indexed in the Spacecraft Name Index.



## SPACECRAFT AND EXPERIMENTS WHICH BECAME INOPERABLE BETWEEN OCTOBER 1. 1972, AND SEPTEMBER 30. 1973

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* *SPACE CRAFT NAME *	NSSOC ID FUNDI	NG COUNTRY	LAUNCH DATE S/ DATE PLACED INDP	C EPOCH DATE	ORBIT TYPE	APO- APS IS	PERI- IN	NCLI- MATION, P	ER IOD
*******	* * * * * * * * * *	* * * * * * * * *	* * * * * * * *		* * * * * :				
	*					DATE EX	Р #		
	* EXPER	RIMENTÉR EXI	PERIMENT NAME			PLACED INOP	*		
1972-079A	72-079A UNITE	D STATES 1	10/10/72 01/08/7	3 10/10/72	GEOCENTRIC	271.0	158.0	96.5	55.8
AEROS	72-100A FED. F 72-100A-01 KRANN		12/16/72 08/22/7 NSITY AND COMPOS IMOSPHERE (2-44A	ITION OF UP	GEOCENTRIC PPER	864 • 7 08/22/73	218.0	96.9	95.5
	72-100A-02 SPEN	NER ENE	ERGY DISTRIBUTIO		ND	08/22/73			
	72-100A-03 NESKE		ECT FON CONCENTRA	TTON TO THE	TONOCOUEDE	08/22/73			
	72-100A-04 SCHM	IDTKE FLU	JX AND SPECTRAL	D ISTR IBUT IQ	N OF SOLAR	08/22/73		•	
	72-100A-05 SPEN	CER NEU	UV RAD AND THEIR Tral gas temper			08/22/73	•		
	72-100A-06 ROEME		HERMOSPHERE Mospheric Drag A	NALYS IS		08/22/73			
APOLLO 15 SUBSATELL [T	E 71-0630 UNITED	STATES 0							
	71-063D-03 SJØGR		08/04/71 08/23/7 Band transponder		SELENOCEN	141.3	102.0	28.7	119-8
APOLLO 16 LM/ALSEP			4/16/72 / /	•	LUNAR LANDE	Ŕ			
	72-031C-03 SONET	'T LUN	IAR SURFACE MAGN	ETOMETER		02/15/73			
APOLLO 17 CSM	72-096A UNITED	STATES 1	2/07/72 12/19/7	2 12/12/72	SELENOCEN	1864-4	1833.6	159.9	118.8
	72-096A-01 SJBGR		BAND TRANSPONDER			12/16/72	103318	10949	110.0
	72-096A-02 FASTI	E FAR	ULTRAVIOLET SPI	ECTROMETER		12/19/72			
	72-096A-03 LOW		RARED SCANNING	RADIOMETER		12/19/72			
•	72-096A-04 PHILL		IAR SOUNDER EXPE	RI MENT		12/16/72			
	72-096A-05 DOYLE		IDHELD PHOTOGRAPI	-TY		12/19/72			•
	72-096A-06 DOYLE		IORAMIC PHOTOGRAI	PHY		12/16/72			
	72-096A-07 DOYLE		RIC PHOTOGRAPHY			12/16/72			
	72-096A-08 DOYLE	- 171-	PING CAMERA ASPE Otography	ECT STELLAR		12/16/72			
	72-096A-09 KAULA		ER ALTIMETER			12/16/72		,	
	72-096A-10 COUR-		DEW METEOROID D	ET ECTOR		12/19/72			
•	72-096A-11 UNKNO	WN TEL	EVISION COVERAGE	E OF EVA!S	-	12/14/72			
APOLLO 17 LM/ALSEP	72-096C UNITED	STATES 1	2/07/72 / /						
•	72-096C-02 SWANN		AR FIELD GEDLOG	•		12/13/72		•	
	72-096C-03 TALWA		AR TRAVERSE GRAV	/IMETER		12/13/72			
	72-096C-04 MITCH	ELL SCI	L MECHANICS			12/13/72			
	72-096C-07 SIMMO		FACE ELECTRICAL			12/13/72			•
	72-096C-12 WALKE		AR SURFACE COSM	IC RAY		12/13/72			
	72-096C-13 BURNE 72-096C-14 SJOGR	- · <del>-</del> -	TRON PROBE			12/13/72			
	, 2 0 9 0 C - 14 5 3 0 GR	5-8	AND TRANSPONDER			12/16/72			
ATS 1	66-110A UNITED 66-110A-09 SUDMI		2/07/66 / / N-SCAN CLOUDCOVE		GEOCENTRIC SSCC)	36887.0 10/16/72	35852.0	0+2	1466.0

# SPACECRAFT AND EXPERIMENTS WHICH BECAME INOPERABLE BETWEEN OCTOBER 1. 1972, AND SEPTEMBER 30. 1973

*		CHARTAE COMPAN	<u> </u>	POCH ORBIT TYPE		PERI- INC APSIS NA		RIOD
*SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	DATE PLACED INOP	VAIE	A-213		,	
* * * * * * * * * * *	******	* * * * * * * * *				* * * * *	* * * *	* * *
•	*			•	DATE EXP			
	*	EXPERIMENTER	EXPERIMENT NAME	•	PLACED INOP	*		
	*				INUP	•		
COSMOS 200	68-00EA	U.S.S.R.	01/20/68 02/24/73 01	/20/68 GEOCENTRIC	537.0	523.0	74.0	95.2
D5-A	D <del>.C.</del> A	FRANCE	04/27/73 04/27/73					
		UNITED STATES				•		
D5-8	05-8	FRANCE	04/27/73 04/27/73					
		UNITED STATES		•				
				ANALET CELENDOEN	9388.0	2568.0	169.0	691.8
EXPLORER 35	67-070A	UNITED STATES	07/19/67 06/24/73 07 ELECTRON AND PROTON DE		06/24/73	230044		
	67-070A-01		ENERGETIC PARTICLE	LIECIONS	06/24/73			
	67-070A-02		AMES MAGNETIC FIELDS		06/24/73			
	67-070A-03 67-070A-04		GSFC MAGNETOMETER		06/24/73			
		ALEXANDER	MICROMETECRITE FLUX	•	06/24/73			
	67-070A-07		LOW-ENERGY INTEGRAL SF	ECT RUM	06/24/73			
	07-07 VA-07	36.60	MEASUREMENT EXPERIMENT					
	67-070A-06	PETERSON	BISTATIC RADAR OBSERVA		06/24/73			
	67-070A-09	KAULA	SELENODETIC STUCIES		05/24/73			
		SLIFER. JR.	SOLAR CELL DA MAGE		06/24/73			
			06/21/69 12/23/72 06	6/21/69 GEOCENTRIC	176434.0	378.0	86.8	4843.0
EXPLORER 41	69-053A	UNITED STATES	LOW-ENERGY SOLID-STATE		12/23/72	<del>-</del>		
	69-053A-01		ION CHAMBER		12/23/72			
	69-053A-02		CCSMIC-RAY PROTON (R )	VS DE/DX}	12/23/72			
	69-053A-03		LOW-ENERGY PROTON AND		12/23/72			
	69-053A-04	+ EKMIN	DIFFERENTIAL ENERGY					
	69-053A-05	5 MCCRACKEN	COSMIC-RAY ANISOTROPY		12/23/72			
	69-053A-07		SOLAR PROTON MONITORI		12/23/72			
	69-053A-09		LOW-ENERGY PROTON AND		12/23/72			
	69-053A-10		COSMIC-RAY ENERGY VS		12/23/72			
	69-053A-11		MAGNETIC FIELD EXPERI	ME NT	12/23/72			
540 605D 43	71-019A	UNITED STATES	03/13/71 / / 0	9/05/73 GEOCENTRIC	195513.0	9864.9	37.7	5974.5
EXPLORER 43		5 ER ICK SON	INTERPLANETARY LONG W	AVELENGTH RADIO	10/10/72			
			ASTRONOMY EXPERIMENT					
			11/15/71 / / 09	9/06/73 GEOCENTRIC	25175.8	281.3	3.5	438-1
EXPLORER 45	71-096A	UNITED STATES	11/15/71 / / 01 FLUXGATE MAGNETOMETER		04/01/73			
	71-096A-04 71-096A-04	\$ CAHILL, JR. 5 maynard	D.C. ELECTRIC FIELD M		05/01/73			
				A.A. 144 A.A.A.A.	037971 ^	202204.0	Q _ E	17602.0
EXPLORER 47	72-073A	UNITED STATES		8/23/73 GEOCENTRIC	04/10/73		0.0	
	72-073A-01	1 NESS	MAGNETIC FIELDS EXPER	I WE'NI	U 7/ IU/ /3			
CV 00 00 00 40	72-091A	UNITED STATES	11/15/72 06/08/73 1	1/16/72 GEOCENTRIC	630.7	445.5	1-9	95.4
EXPLORER 48	1 5 A 1W	CHILD SINIES						

*								
* *SPACECRAFT *	NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE S/C ÉPOCH ORBIT TYPE DATE PLACED DATE INOP	APO~ APS 15	PERI~ . APSIS	INCLI- NATION	PERI DD
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	4	*		•	DATE EXP	*		
		*	EXPER IMENTER	EXPERIMENT NAME	PLACED	*		
		*		•	INOP	*		
		72-091A-01	FICHTEL	GAMMA RAY TELESCOPE	06/08/73			
1T05-E		I TO S-E	UNITED STATES	07/16/73 07/16/73				
MARINER 9		71-051A	UNITED STATES	05/30/71 10/27/72 11/16/71 MARSCENTRIC	17168.0	1455.0	64.	4 719.0
		71-051A-01	NEUGEBAUER	INFRARED RADIOMETER (IRR)	10/27/72	•		
		71-051A-02	BARTH	ULTRAVIOLET SPECTROMETER (UVS)	10/27/72			
		71-051A-03	HANEL	INFRARED INTERFEROMETER SPECTROMETER (IRIS)	10/27/72			
		71-051A-04	MASURSKY	TELEVISION PHOTOGRAPHY	10/27/72			
		71-051A-07	LOWELL	CELESTIAL MECHANICS	10/27/72			
		71-051A-08	KLIDRE	S BAND OCCULTATION EXPERIMENT	10/27/72			1
OAD 2			UNITED STATES	12/07/68 02/14/73 12/10/68 GECCENTRIC	778.0	765.0	35.	0 100-0
		68-110A-02	CODE	WISCONSIN EXPERIMENT PACKAGE	02/01/73			
<b>0</b> 50 5		69-006A	UNITED STATES	01/22/69 / / 01/22/69 GEOCENTRIC	570 •0	532.0	33.	95.8
		69-006A-03		SOLAR SPECTRUM STUDIES	12/00/72			
-		69-006A-04	CHUBB	SCLAR X—RAY RADIATION ION CHAMBER PHOTOMETER	12/31/72			
		69-00 6A-08	RENSE	SOLAR EXTREME ULTRAVIOLET MONITOR	12/31/72			
050 7		71-083A	UNITED STATES	09/29/71 / / 09/04/73 GEDCENTRIC	424.7	297.9	33.	91.8
		71-083A-06	CHUPP	SOLAR GAMMA-RAY MONITOR	12/25/72			
PIONEER 7			UNITED STATES	08/17/66 / / 08/17/66 HEL TOCENTRIC	1.1	1.0	0+:	402.9
		66-075A-02	BRIDGE	SCLAR WIND PLASMA FARADAY CUP	11/00/72			